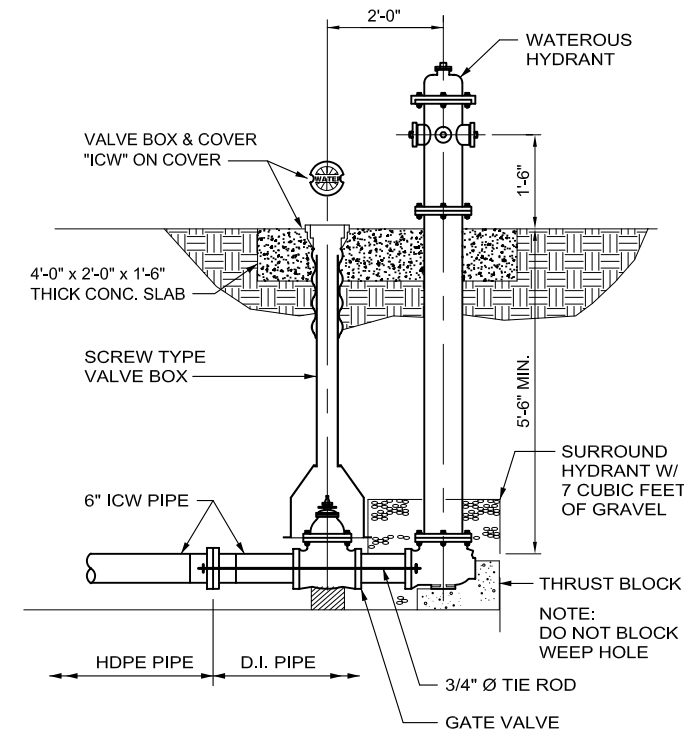
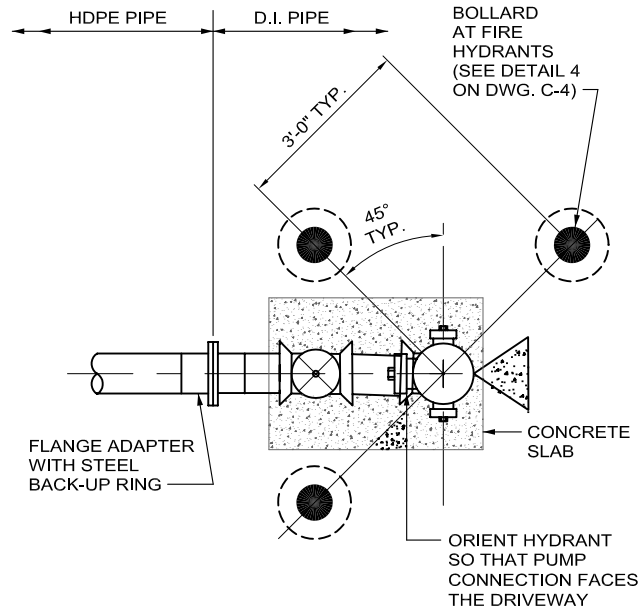


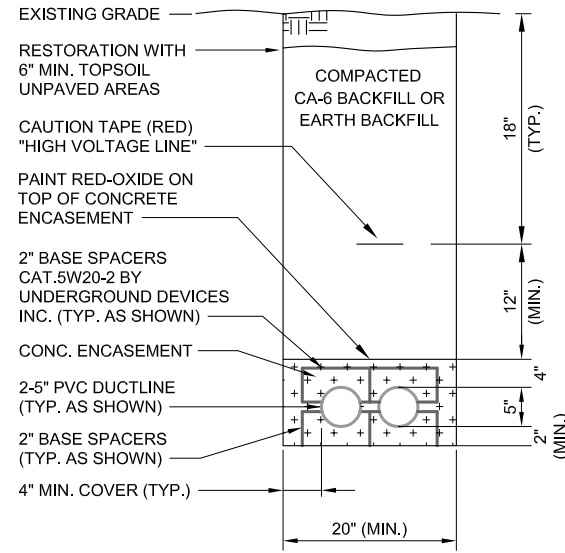
			<b>LEGEND:</b> <div><div>↑ 19.0 ↓</div><div>MINIMUM (FT.) REQUIRED EARTH SHIELDING EQUIVALENT</div></div>	<div>EXISTING</div> <div><div></div><div></div><div></div><div></div><div></div></div>	<div>NEW</div> <div><div></div><div></div><div></div><div></div><div></div></div>	<div>ITEM</div> <div><div>4' WOVEN WIRE FENCE</div><div>8' ORNAMENTAL FENCE</div><div>CHAIN LINK FENCE</div><div>EARTH SHIELDING</div><div>STEEL SHIELDING</div></div>	<div>NAME</div> <div>DESIGNED</div> <div>DRAWN</div> <div>CHECKED</div> <div>APPROVED</div> <div>SUBMITTED</div>		<div>DATE</div>		<div>SCALE:</div> <div>1" = 5'-0"</div> <div><div>50510</div><div>SCALEFEET</div></div>	<div>FERMI NATIONAL ACCELERATOR LABORATORY</div> <div>UNITED STATES DEPARTMENT OF ENERGY</div> <div><div><div></div></div><div><div>MuCOOL ENCLOSURE</div><div>CROSS SECTION F</div></div></div> <div><div>DRAWING NO. 4-1-35</div><div>C-6</div><div>REV.</div></div>		
REV.	DATE	DESCRIPTIONS REVISIONS												



**FIRE HYDRANT  
DETAIL**

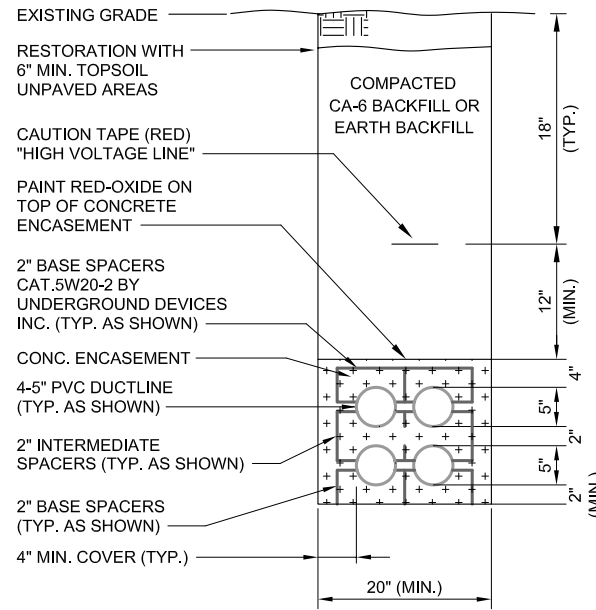
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C-4



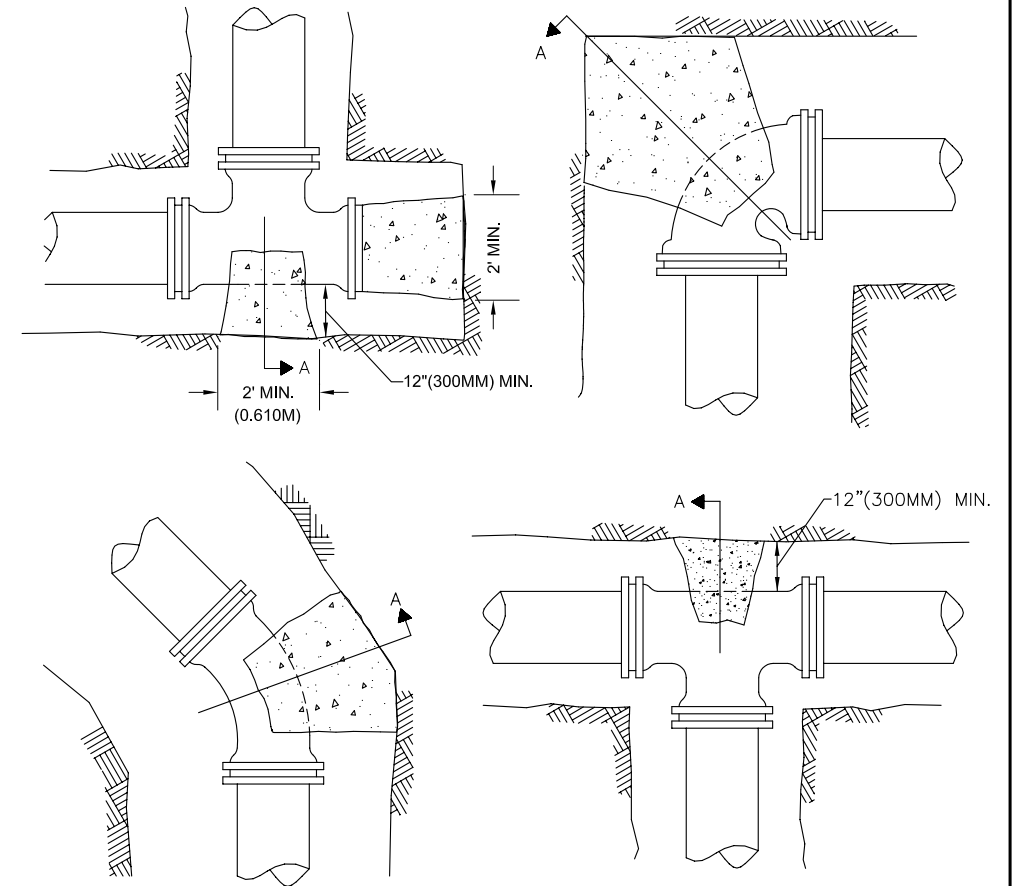
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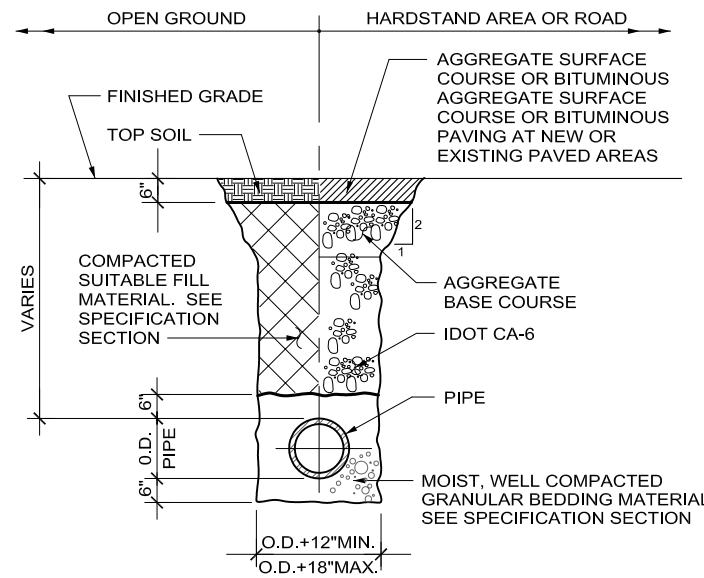
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**THRUST BLOCK  
DETAIL**

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7  
-



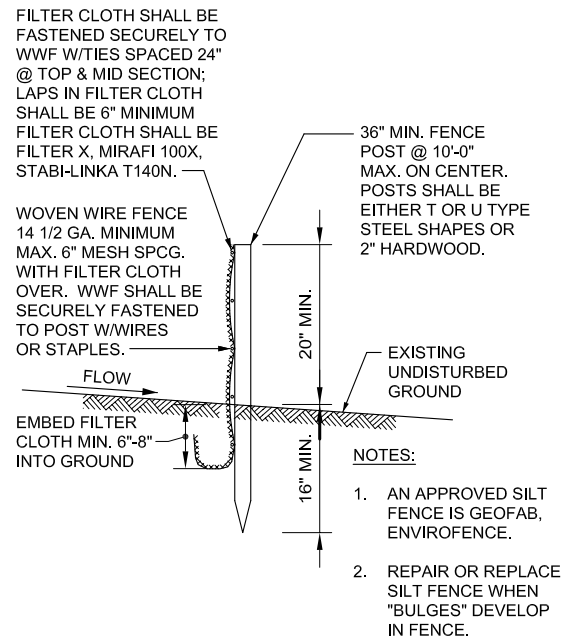
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D  
-

**PAVEMENT  
SECTION**

N.T.S.

E  
-



N.T.S.

6  
-

PLOT-DATE

REV.	DATE	DESCRIPTIONS
2	01/31/03	ADDED OPTION TO USE NuMI STONE FOR BASE COURSE
REVISIONS		

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



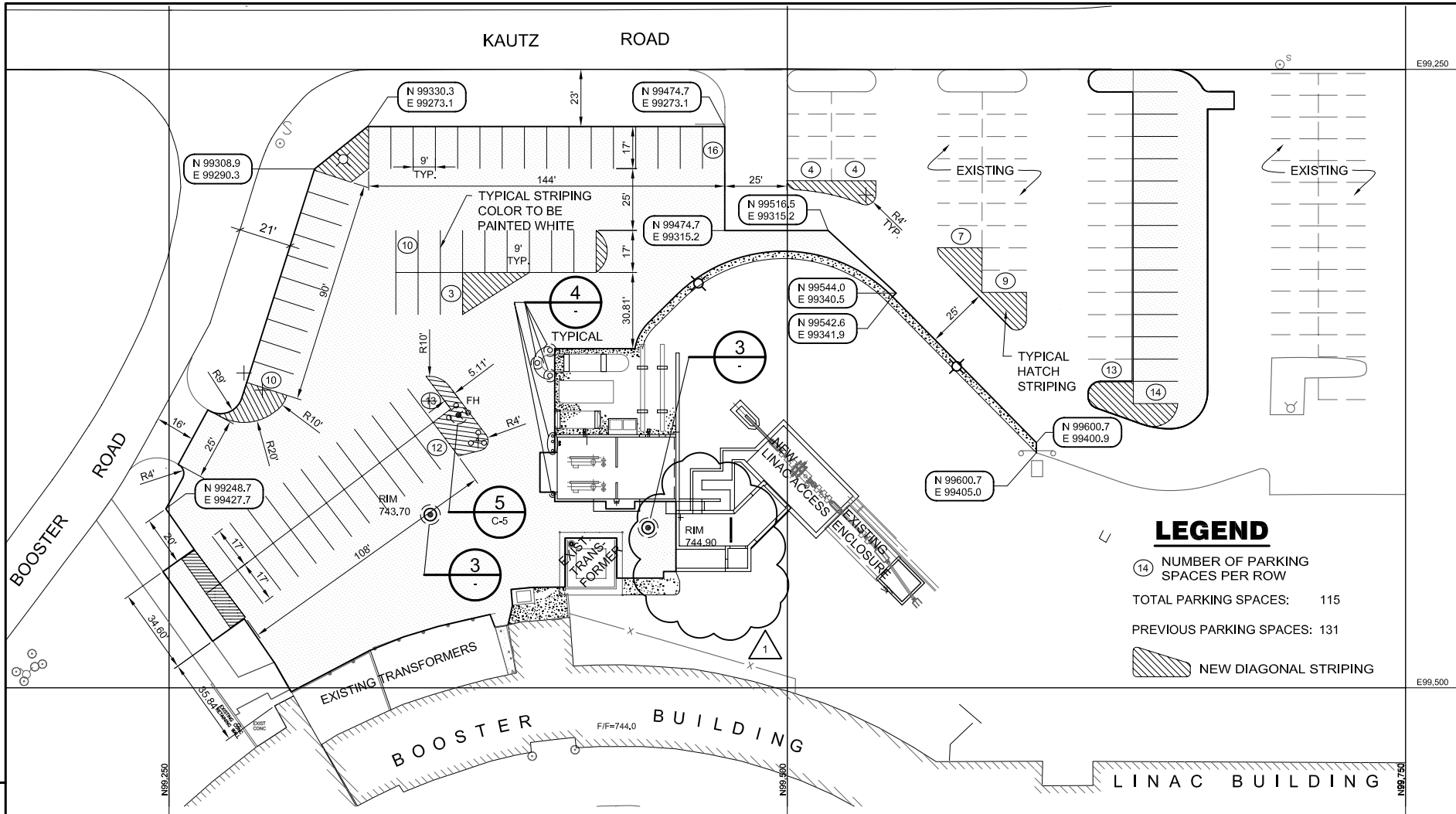
**MuCOOL ENCLOSURE  
MISCELLANEOUS DETAILS**

DRAWING NO. **4-1-35**

**C-5**

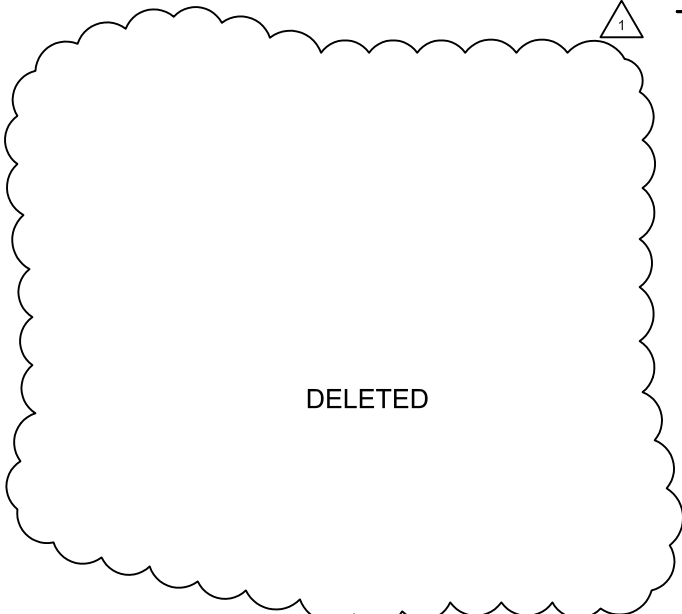
REV. **2**

07 JAN 2003



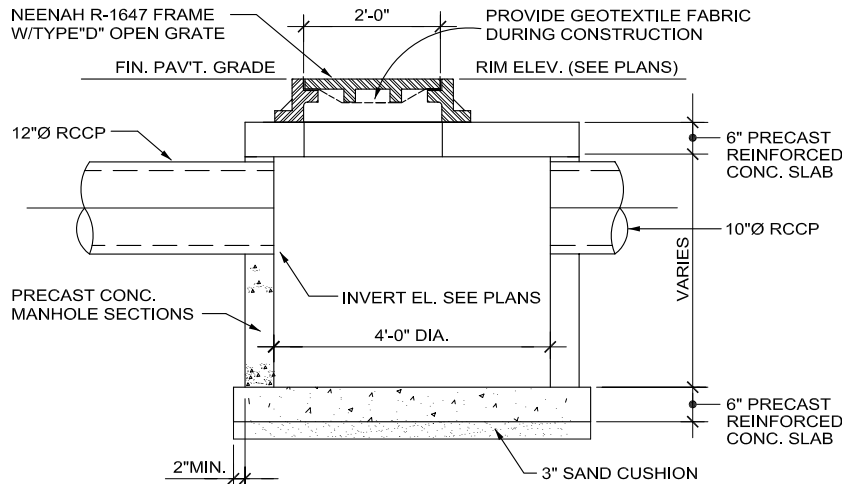
GEOMETRICS & STRIPING PLAN

SCALE: 1"=30'-0"



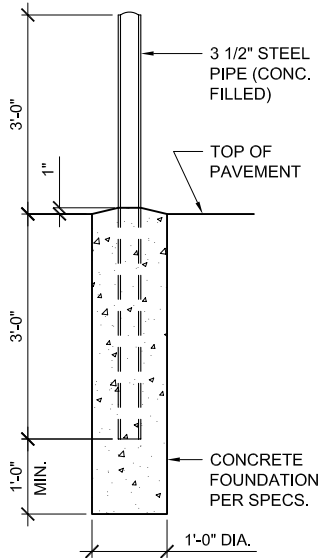
INLET DETAIL

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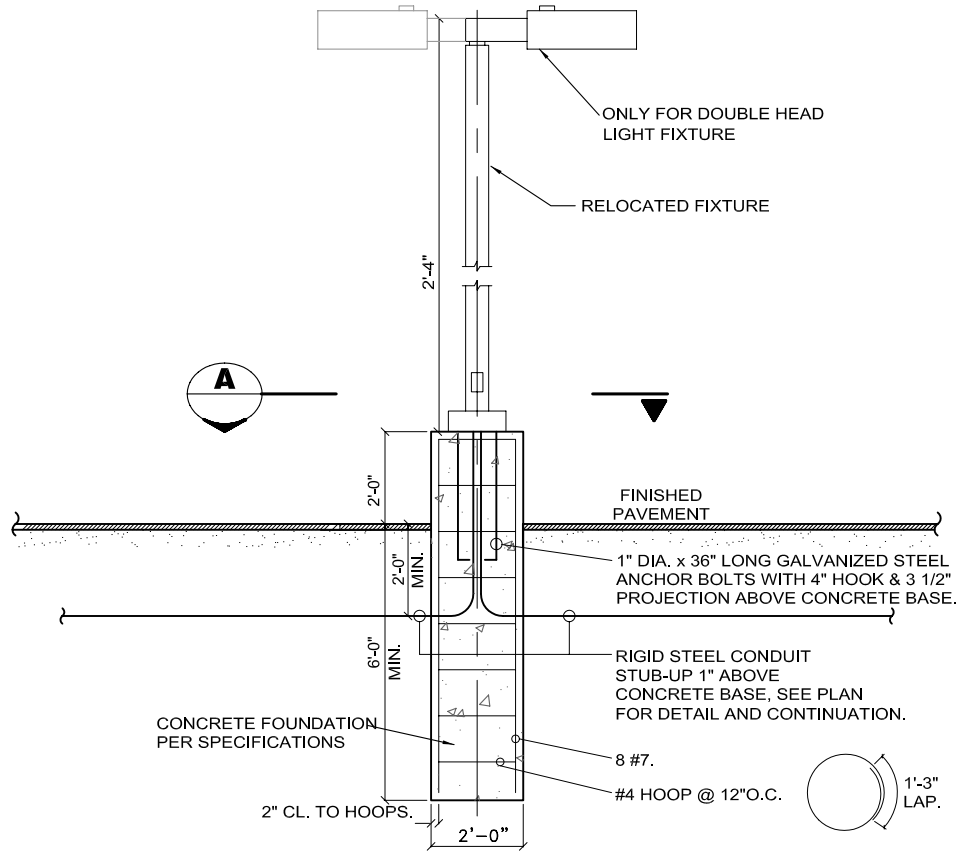
CATCH BASIN DETAIL

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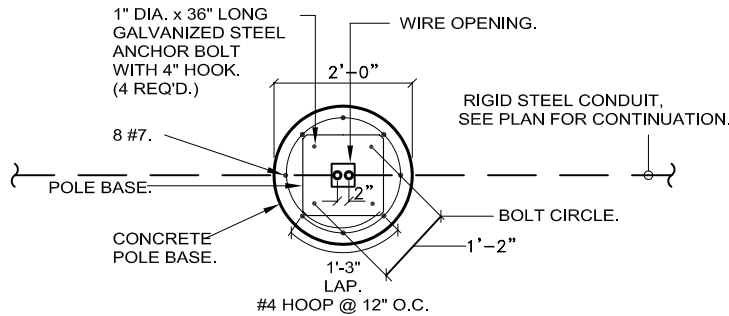
BOLLARD DETAIL

N.T.S.



TYPICAL FIXTURE DETAIL

N.T.S.



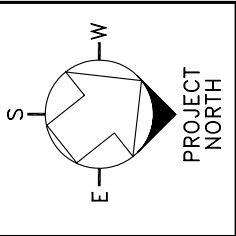
CONC. POLE BASE SECTION

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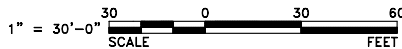
PLEASE NOTE: POLE BASE DIMENSIONS (ESPECIALLY ANCHOR BOLT LOCATIONS) SHOULD BE VERIFIED BY CONTRACTOR ACCORDING TO MANUFACTURER'S DWGS.

REV.	DATE	DESCRIPTIONS
1	01/31/03	DELETED INLET, REVISED ENCLOSURE WALLS
		REVISIONS

DESIGNED	NAME	DATE
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



SCALE:



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

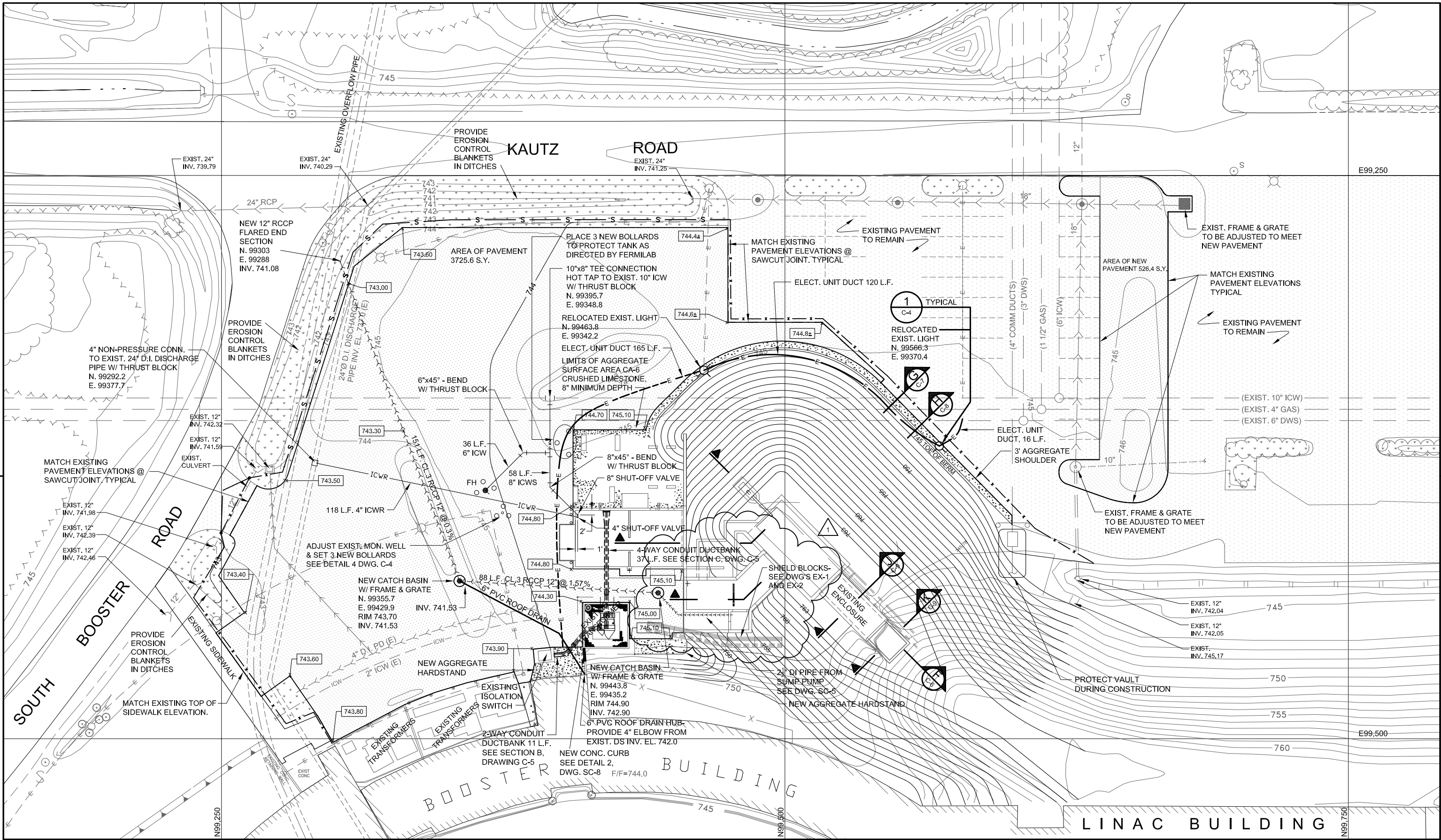


MuCOOL ENCLOSURE  
PROPOSED GEOMETRICS & STRIPING

DRAWING NO. 4-1-35

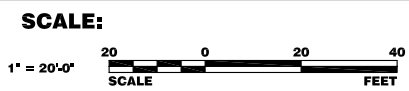
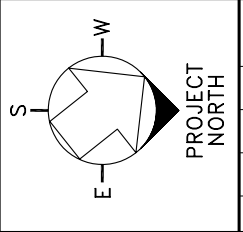
C-4 REV. 1

31 JAN 2003




REV.	DATE	DESCRIPTIONS
1	01/31/03	DELETED INLET, REVISED ENCLOSURE WALLS
REVISIONS		

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**  
**PROPOSED SITE PLAN**

DRAWING NO. **4-1-35** **C-3** REV. 1

31 JAN 2003

## GENERAL NOTES

## GENERAL

1. THE SUBCONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS BEFORE STARTING WORK. IF CONDITIONS VARY FROM THOSE INDICATED ON THE DRAWINGS, THE FERMLAB CONSTRUCTION COORDINATOR SHALL BE NOTIFIED AND NO WORK SHALL BE DONE IN THE AREA WITHOUT HIS APPROVAL.
2. SCALE FOR THE DRAWINGS IS FOR GENERAL INFORMATION ONLY. LOCATIONS AND DIMENSIONS SHALL BE TAKEN AS SHOWN AND NOT SCALED.
3. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO ASCERTAIN EXISTING FIELD CONDITIONS BEFORE BIDDING ON THIS PROJECT, ORDERING MATERIALS, OR BEGINNING CONSTRUCTION.
4. SUBCONTRACTOR'S WORK ACTIVITIES SHALL BE RESTRICTED TO AREAS WITHIN THE LIMITS OF CONSTRUCTION AS NOTED ON THE DRAWING. SUBCONTRACTOR'S ACTIVITIES AND VEHICLES SHALL NOT BE ALLOWED OUTSIDE OF THESE LIMITS UNLESS APPROVED BY THE FERMLAB CONSTRUCTION COORDINATOR.
5. SPECIAL ATTENTION SHALL BE PLACED ON PROTECTION OF EXISTING SURVEY MONUMENTS, WELLS, WETLANDS AND IN OTHER AREAS AS NOTED ON THE DRAWINGS. THESE AREAS ARE TO BE CONSIDERED NON-DISTURBANCE AREAS UNLESS SPECIFICALLY NOTED OTHERWISE.

## SURVEY AND LAYOUT

1. ELEVATION BENCHMARK AND ALIGNMENT MONUMENTS HAVE BEEN ESTABLISHED WITHIN THE SITE, AND ARE INDICATED ON THE DRAWINGS. ALL ELEVATIONS ARE BASED ON USGS SURVEY DATUM. ALL SUBSEQUENT LAYOUT AND ELEVATION CONTROL, USING THESE REFERENCES, IS THE RESPONSIBILITY OF THE SUBCONTRACTOR.
2. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PROPER ALIGNMENT (VERTICAL AND HORIZONTAL) AT ALL INTERFACES BETWEEN NEW AND EXISTING WORK TO ASSURE PROPER INSTALLATION AND USAGE.
3. PERIODICALLY, THE FERMILAB ALIGNMENT GROUP WILL RUN SPOT CHECKS ON CRITICAL PARTS OF THE CONSTRUCTION.

## UTILITIES

1. ICW WATER LINES SHALL HAVE 5'-6" MINIMUM COVER BELOW GRADE. ALL OTHER WATER LINES SHALL HAVE 5'-0" MINIMUM COVER BELOW GRADE.
2. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AT ALL PRESSURE PIPE MAIN TEES, CAPS, VALVES, HYDRANTS AND BENDS 11-1/4 DEGREES OR GREATER.
3. THE APPROXIMATE LOCATION OF KNOWN UTILITIES ARE SHOWN ON THE DRAWINGS. THE SUBCONTRACTOR SHALL VERIFY THE LOCATION OF THESE UTILITIES AND THE EXISTENCE AND LOCATION OF ANY UTILITIES NOT SHOWN. THE FERMLAB CONSTRUCTION COORDINATOR SHALL BE NOTIFIED IMMEDIATELY, IF THE ACTUAL LOCATION OF THE UTILITIES IS NOT AS SHOWN ON THE DRAWINGS OR WHEN UTILITIES NOT SHOWN ARE LOCATED.
4. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UNDERGROUND AND SURFACE UTILITIES. ANY UTILITY DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED AT THE SUBCONTRACTOR'S EXPENSE TO THE COMPLETE SATISFACTION OF FERMLAB.
5. ALL DUCT RUNS PASSING UNDER ROADWAYS OR TRAVELLED SURFACES SHALL BE SCHEDULE 40 PVC CONDUIT ENCASED ON ALL SIDES WITH A 2" CONCRETE ENVELOPE AND REINFORCED AS SPECIFIED. REINFORCING SHALL CONSIST OF 1/2" ROUND BARS SPACED 6" ON CENTER, PARALLELING DUCTS ON TOP, BOTTOM AND SIDES, WITH 1/2" FORMED TIE BARS SPACED 12" ON CENTERS. BARS SHALL OVERLAP 40 DIAMETERS AND SHALL EXTEND 5' BEYOND ROADS OR DRIVES ON EACH SIDE. DUCT RUNS PASSING UNDER ROADWAYS OR TRAVELED SURFACES SHALL BE BACKFILLED WITH CA-6 COMPACTED TO 95% STANDARD PROCTOR.

### SUBCONTRACTOR LIMITS

1. SUBCONTRACTOR SHALL RESTRICT HIS ACTIVITIES AND PERSONNEL TO ONLY HIS WORK AREAS AND OTHER AREAS DESIGNATED BY THE FERMILAB CONSTRUCTION COORDINATOR TO BE ACCESSIBLE TO THE SUBCONTRACTOR. IN GENERAL, THE SUBCONTRACTOR LIMITS SHALL BE RESTRICTED TO WITHIN THE AREAS IDENTIFIED ON THE DRAWINGS AND OTHER AREAS APPROVED BY THE FERMILAB CONSTRUCTION COORDINATOR. TRAVEL ACROSS OPEN GROUND AND HAUL ROADS CONSTRUCTED OUTSIDE OF THESE LIMITS WILL NOT BE PERMITTED.
2. SUBCONTRACTOR'S PARKING TRAILERS SHALL BE LIMITED TO THE CONSTRUCTION AREA IDENTIFIED. MAINTENANCE AND REPAIRS SHALL ALSO BE LIMITED TO THIS AREA.
3. STOCKPILING OF MATERIALS SHALL BE LIMITED TO THE CONSTRUCTION AREA.

## EARTHWORK

1. PERSONNEL PROTECTION GUARDRAIL IN ACCORDANCE WITH OSHA REQUIREMENTS SHALL BE PROVIDED AROUND ALL OPEN EXCAVATION & TRENCHES.
2. SWALE AND DITCHES SHOWN ARE INTENDED TO INDICATE THE DIRECTION OF RUNOFF. EXACT PROFILES HAVE NOT BEEN ESTABLISHED DUE TO THE SHALLOW NATURE OF THESE DITCHES AND THE SURROUNDING GROUND. THE INTENT OF THESE DITCHES IS TO GRADE TO DRAIN AND THEIR PROFILE SHALL BE ADJUSTED ACCORDINGLY.
3. IT SHALL BE THE SUBCONTRACTOR'S RESPONSIBILITY TO MAINTAIN DRAINAGE FLOWS AT ALL TIMES DURING THE PERFORMANCE OF THE WORK. SURFACE WATER RUNOFF SHALL BE CONTROLLED IN SUCH A MANNER TO PREVENT PONDING. AREAS WITHIN THE CONSTRUCTION LIMITS SHALL BE GRADED IN SUCH A WAY THAT THE SURFACE WATER WILL FREELY FLOW TOWARD A DITCH, SWALE, OR DRAINAGE STRUCTURE.
4. TO THE MAXIMUM EXTENT PRACTICABLE, THE WORK SITE SHALL BE EXCAVATED, GRADED AND STABILIZED IN STAGES SO THAT UNPROTECTED, DENUDED AREAS ARE MINIMIZED.
5. CLEARING AND GRUBBING SHALL ALSO BE STAGED TO THE GREATEST EXTENT POSSIBLE SO THAT AREAS ARE CLEARED ONLY AS REQUIRED FOR SEQUENCE OF THE OPERATIONS.
6. ALL EXCAVATIONS SHALL BE INSPECTED BY THE FERMLAB CONSTRUCTION COORDINATOR BEFORE POURING MUD SLABS, PLACING FORMS OR REINFORCING STEEL OR SETTING PIPE OR OTHER UTILITIES.

## EROSION CONTROL

1. SUBCONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING SOIL AND EROSION CONTROL MEASURES NECESSARY TO MEET THE REQUIREMENTS OF SPECIFICATION SECTION 02370.
2. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE PROPERLY INSTALLED AND FUNCTIONING PRIOR TO CONSTRUCTION IN AN AREA.
3. SUBCONTRACTOR SHALL IMPLEMENT A DAILY INSPECTION PROGRAM OF THE EROSION AND SEDIMENT CONTROL MEASURES AND MAINTAIN THESE MEASURES IN A FUNCTIONAL CONDITION. IN ACCORDANCE WITH THE ILLINOIS URBAN MANUAL AND SECTION 02370. EARTHEN STRUCTURES SUCH AS DIKES, BERMS AND SWALES SHALL BE STABILIZED BEFORE BEING CONSIDERED FUNCTIONAL.
4. SURFACE WATER RUNOFF SHALL BE CONTROLLED IN SUCH A MANNER TO PREVENT PONDING. THE CONSTRUCTION AREA & SURROUNDING AREAS SHALL BE GRADED IN SUCH A WAY THAT THE SURFACE WATER WILL FREELY FLOW TOWARD DITCHES, SWALES OR DRAINAGE STRUCTURES.
5. PERMANENT SEEDING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02930.
6. STRIPPING OF VEGETATION, GRADING OR OTHER SOIL DISTURBANCE SHALL BE DONE IN A MANNER WHICH WILL MINIMIZE SOIL EROSION.
7. TEMPORARY GROUND COVER, SODDING OR EROSION BLANKET SHALL BE USED TO PROTECT ALL EXPOSED AREAS DURING CONSTRUCTION. APPROPRIATE SEED SHALL BE USED FOR TEMPORARY GROUND COVER AND STABILIZATION DEPENDENT UPON THE TIME OF YEAR THAT CONSTRUCTION IS TAKING PLACE.
8. SEDIMENT SHALL BE RETAINED ON SITE AND NOT ALLOWED TO ENTER THE DRAINAGE WAYS.
9. CUT AND FILL SLOPES AND STOCKPILED MATERIAL SHALL BE PROTECTED TO PREVENT EROSION.


12. AN EFFORT HAS BEEN MADE TO AVOID DISRUPTION OF AS MANY TREES AS POSSIBLE. SUBCONTRACTOR SHALL MARK THOSE TREES NECESSARY TO BE REMOVED TO COMPLETE THE WORK AS SHOWN. THE FERMLAB CONSTRUCTION COORDINATOR SHALL OBSERVE THE MARKING OF THE TREES TO BE REMOVED PRIOR TO THE SUBCONTRACTOR REMOVING THE TREES. TREES TO BE REMOVED BY OTHERS AS SHOWN ON DRAWING D-1.

## DESIGN CRITERIA AND REFERENCES

1. ILLINOIS DEPARTMENT OF TRANSPORTATION  
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
2. IEPA, ILLINOIS URBAN MANUAL

[illegible]

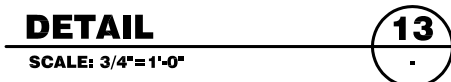
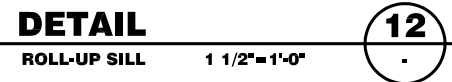
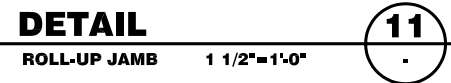
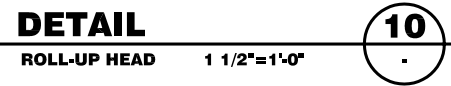
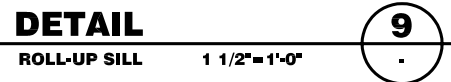
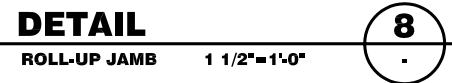
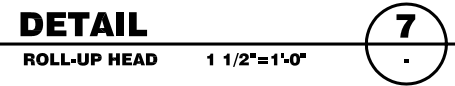
LEGEND											
EXISTING	NEW	DESCRIPTION	ABBREV.	EXISTING	NEW	DESCRIPTION	ABBREV.	EXISTING	NEW	DESCRIPTION	ABBREV.
		MONUMENT	MON.			SANITARY LIFT STATION	S.L.S.			BEAM LINE	B.L.
		TEMPORARY BENCHMARK OR BENCHMARK	T.B.M./B.M.			SANITARY /STORM MANHOLE	M.H.			BEAM PIPE	B.P.
		BASE OR SURVEY LINE	BL			POWER/COMMUNICATION MANHOLE	P.M.H./C.M.H.			GUARD RAIL	
		CONSTRUCTION LIMIT				CATCH BASIN	C.B.			BARRICADE	
		SOIL BORING LOCATION	S.B.			CLEAN OUT	C.O.			GATE	
		CONTOUR LINE				INLET				FENCE AND POST	
		ELEVATION	EL.			FIRE HYDRANT-RELOCATED/NEW	F.H.			TELEPHONE POLE	T.P.
		SUMMIT				FIRE HYDRANT & VALVE	F.H. & V.			POWER POLE	P.P.
		BERM OR FILL AREA				GATE VALVE	G.V.			LIGHT POLE	L.P.
		DEPRESSION OR CUT AREA				VALVE AND VAULT	V.V.			REMOVE EXISTING STRUCTURE	
		EARTH				BUTTERFLY VALVE	B.V.			UTILITY REMOVAL	
		TREES AND BRUSH				POST INDICATOR VALVE	P.I.V.			UTILITY ABANDONED	
		TREE AND DIAMETER				CONCENTRIC REDUCER				CENTER LINE ROAD	CL RD.
		TREE TO BE REMOVED				ECCENTRIC REDUCER				STATION	STA.
		STREAM				SUMP BASIN & PUMP	SU BA & PU			WETLANDS	PVMT.
		POND				FAN				GAS - LOW PRESSURE	G.
		DITCH	REMOVED			THRUST BLOCKS	T.B.			GAS - HIGH PRESSURE	G. (HP)
		SWALE				BUMPER POST	B.P.			HELIUM	HE
		TEMPORARY SWALE OR DITCH	T.S.			HEADWALL OR END SECTION				HYDROGEN	H.
		DIRECTION OF DRAINAGE				RETAINING WALL	W			COOLING POND WATER SUPPLY	CPWS
		OPEN STORAGE	O.S.			CONCRETE				COOLING POND WATER RETURN	CPWR
		PILE OF EARTH	P.			LIMITS OF PAVEMENT REMOVAL				INDUSTRIAL WASTE	INW
		EROSION CONTROL EARTH DIKE	E.D.			EXIST. CONC. SIDEWALK TO BE REMOVED				LOW CONDUCTIVITY WATER SUPPLY	LCWS
		EROSION CONTROL PERIMETER DIKE	P.D.			PIPE CULVERT				LOW CONDUCTIVITY WATER RETURN	LCWR
		EROSION CONTROL STRAW BALE DIKE				(SIZE, LENGTH, TYPE & MATERIAL)				CHILLED WATER SUPPLY	CHWS
		EROSION CONTROL SILT FENCE				DOWNSTREAM (INV. EL.)	D.S.I.E.			CHILLED WATER RETURN	CHWR
		STRUCTURE BELOW GRADE				UPSTREAM (INV. EL.)	U.S.I.E.			INDUSTRIAL COLD WATER SUPPLY	ICW
		BUILDING ABOVE GRADE				SANITARY SEWER LINE	SAN. S.			INDUSTRIAL COLD WATER RETURN	ICWR
		FLOOR ELEVATION	FL. EL.			UNDERDRAIN/FIELD TILE	U.D.			DOMESTIC WATER SUPPLY	DWS
		FINISH FLOOR ELEVATION	FIN. FL. EL.			STORM SEWER	S.S.			POWER DUCT	PWR. DUCT
		EROSION CONTROL SEDIMENT TRAP	S.T.			(SIZE, LENGTH, MATERIAL & TYPE)				COMMUNICATION DUCT	COMM. DUCT
		EROSION CONTROL AGGREGATE COVER	A.C.			PUMP DISCHARGE LINE	P.D.			UNDERGROUND ELECTRICAL CABLE	UG ELEC CA
		EROSION CONTROL TEMPORARY SEEDING	T.S.			DUCTILE IRON PIPE	D.I.			ELECTRICAL POWER LINE	EL PWR LN
		EROSION CONTROL MULCHING	M			HIGH DENSITY POLYETHYLENE PIPE	H.D.P.E.			UNDERGROUND TELEPHONE CABLE	UG TEL CA
		INVERT ELEVATION	I.E.			POLYVINYL CHLORIDE PIPE	P.V.C.			TELEPHONE LINE	TEL LINE
		PAVED AREA				REINFORCED CONCRETE PIPE	R.C.P.			CONTROL CABLE	CC
		GRAVEL				REINFORCED CONCRETE CULVERT PIPE	R.C.C.P.			FIRUS CABLE	FIRUS
		TURF AREA				WORK POINT	W.P.			CONSTRUCTION FENCE	
										SILT FENCE	

			NAME			DATE			SCALE:			<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY  <b>MuCOOL ENCLOSURE</b> <b>SYMBOLS AND ABBREVIATIONS</b>			09 SEP 2002
			DESIGNED												
			DRAWN												
			CHECKED												
			APPROVED												
			SUBMITTED						DRAWING NO. <b>4-1-35</b>			<b>C-1</b>	REV.		

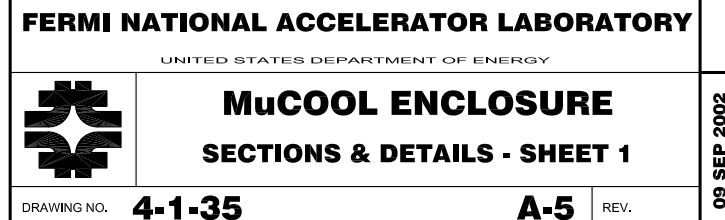


## ROOF HATCH DETAIL

09 SEP 2002



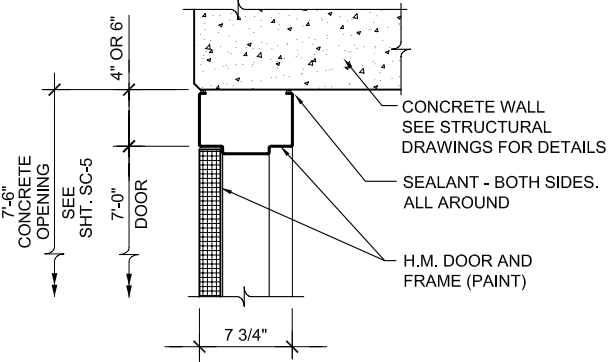
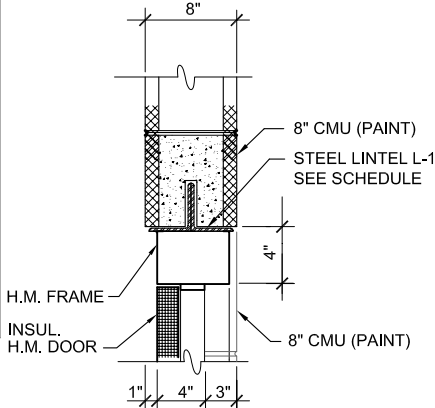
	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



DOOR SCHEDULE																				
DOOR NO.	LOCATION		DOOR								FRAME			DETAILS			HARDWARE GROUP	LABEL	LINTEL	REMARKS
	FROM	TO	S-SINGLE P-PAIR	WIDTH	HGT	THK	TYPE	CORE	MAT'L.	FINISH	TYPE	MAT'L.	FINISH	HEAD	JAMB	SILL				
101	COMPRESSOR ROOM	EXTERIOR	S	16'-0"	9'-0"	-	1	INSUL.	STL	PNT	-	STL	PNT	7/A5	8/A5	9/A5	-	-	-	MANUAL ROLL-UP DOOR
102	EXPERIMENTAL HALL	EXTERIOR	S	12'-0"	8'-0"	-	1	INSUL.	STL.	PNT	-	STL.	PNT	10/A5	11/A5	12/A5	-	-	-	MANUAL ROLL-UP DOOR
103	COMPRESSOR ROOM	EXTERIOR	S	4'-0"	7'-0"	1 3/4"	2	INSUL.	H.M.	PNT	D	H.M.	PNT	(SIM)	(SIM)	(SIM)	HW-1	-	-	
104	REFFRIGERATOR ROOM	EXTERIOR	P	(2)4'-0"	7'-0"	1 3/4"	2	INSUL.	H.M.	PNT	E	H.M.	PNT	(SIM)	(SIM)	(SIM)	HW-3	-	-	
105	COMPRESSOR ROOM	REFRIG. ROOM	P	(2)3'-0"	7'-0"	1 3/4"	2	MIN.	H.M.	PNT	C	H.M.	PNT	1	2	3	HW-4	-	L-1	
106	CORRIDOR	ACCESS PIT	S	3'-4"	7'-0"	1 3/4"	2	INSUL.	H.M.	PNT	F	H.M.	PNT	4	5	6	HW-1	-	-	
107	EXPERIMENTAL HALL	CORRIDOR	S	3'-4"	7'-0"	1 3/4"	2	MIN.	H.M.	PNT	F	H.M.	PNT	4	5	6	HW-2	-	-	NO THRESHOLD
108	STAIR	EXTERIOR	S	3'-4"	7'-0"	1 3/4"	2	INSUL.	H.M.	PNT	F	H.M.	PNT	4	5	6	HW-1	-	-	
109	SUMP EQUIPMENT	EXTERIOR	P	(2)3'-0"	7'-0"	1 3/4"	2	INSUL.	H.M.	PNT	A	H.M.	PNT	4	5	6	HW-3	-	-	
110	HYDROGEN MANIFOLD ROOM	EXTERIOR	S	3'-4"	7'-0"	1 3/4"	3	INSUL.	H.M.	PNT	F	H.M.	PNT	4	5	6	HW-1	-	-	PROVIDE LOUVER SEE SHEET M-3

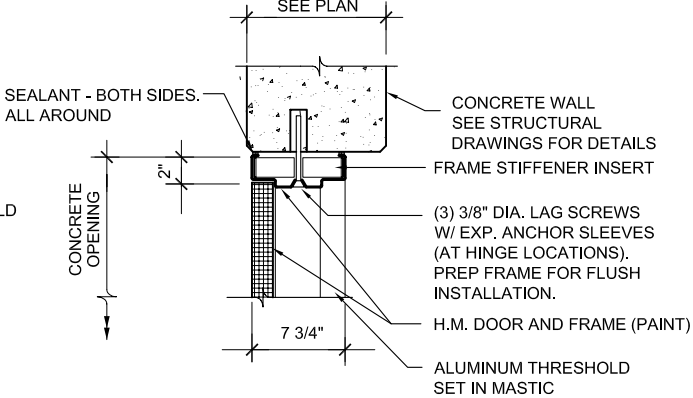
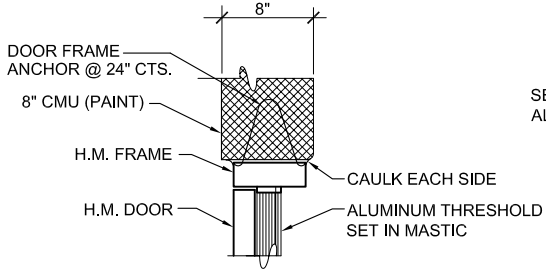
LINTEL SCHEDULE				
NO.	SIZE	SHAPE	M.O.	BRG. LENGTH (EACH END)
L-1	(2) L 5" x 3 1/2" 3/8"		6'-4"	8"

\* WELD BACK TO BACK ANGLES - 2" @ EA. END AND 2" @ 12" O.C. BETWEEN  
NOTE: ALL LINTELS TO BE HOT DIPPED GALVANIZED PER ASTM A123



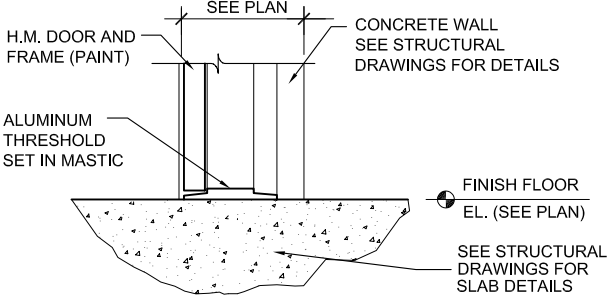
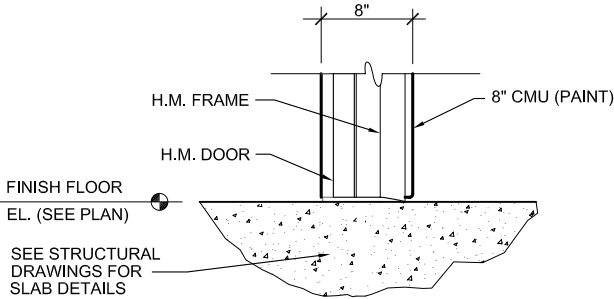
**DETAIL**  
DOOR HEAD 1 1/2"=1'-0" 1

**DETAIL**  
H.M. DOOR HEAD 1 1/2"=1'-0" 4



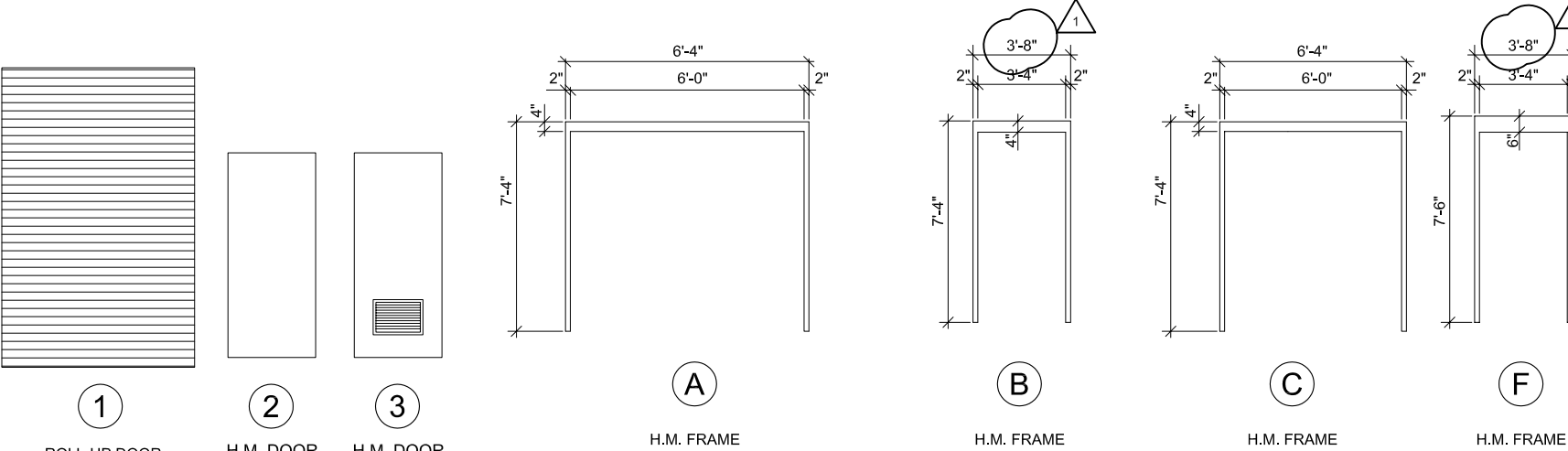
**DETAIL**  
DOOR JAMB 1 1/2"=1'-0" 2

**DETAIL**  
H.M. DOOR JAMB 1 1/2"=1'-0" 5



**DETAIL**  
DOOR SILL 1 1/2"=1'-0" 3

**DETAIL**  
H.M. DOOR SILL 1 1/2"=1'-0" 6



**DOOR TYPES**  
N.T.S.

**FRAME TYPES**  
N.T.S.

REV.	DATE	DESCRIPTIONS REVISIONS
1	01/31/03	REVISED FRAME DIMENSIONS

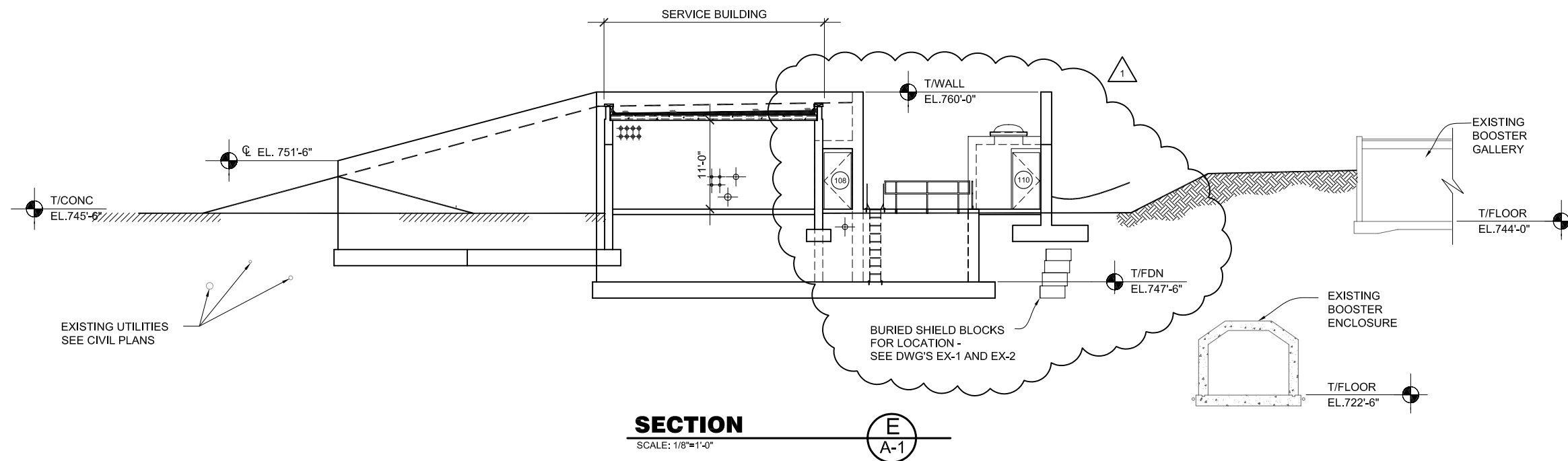
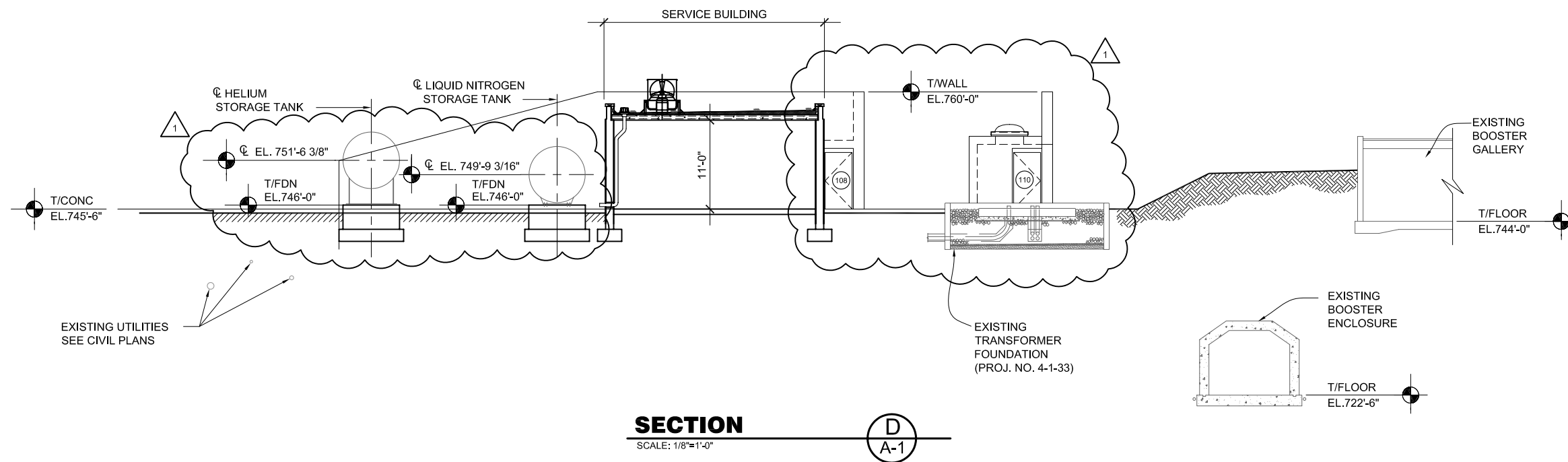
NAME		DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**  
**DOOR SCHEDULE AND DETAILS**

DRAWING NO. **4-1-35** **A-4** REV. 1



REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS & TANK FDN'S
		REVISIONS

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

SCALE:



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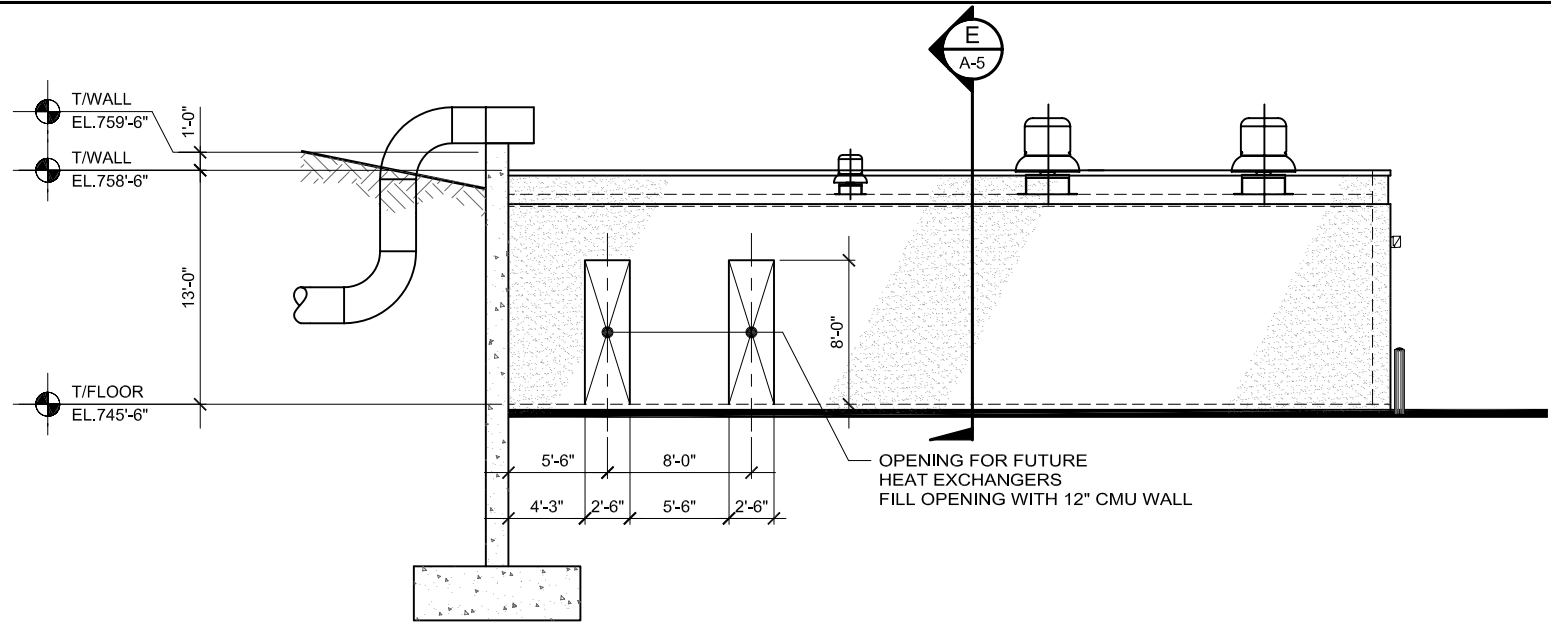
**MuCOOL ENCLOSURE**  
**CROSS SECTIONS**

DRAWING NO. **4-1-35**

**A-3**

REV. 1

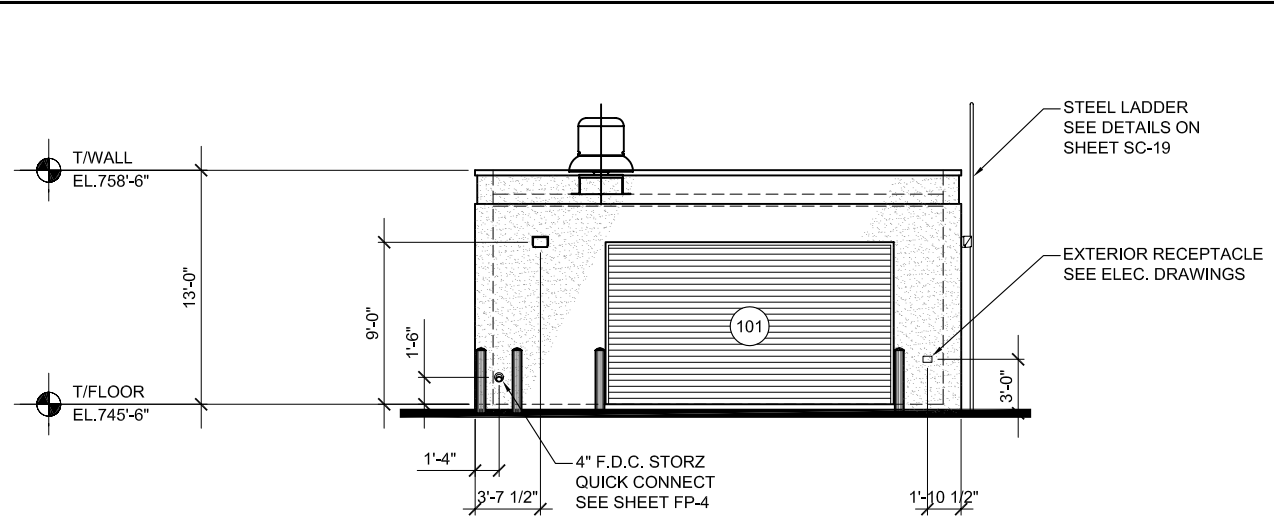
31 JAN 2003



**SERVICE BUILDING  
WEST ELEVATION**

SCALE: 3/16"=1'-0"

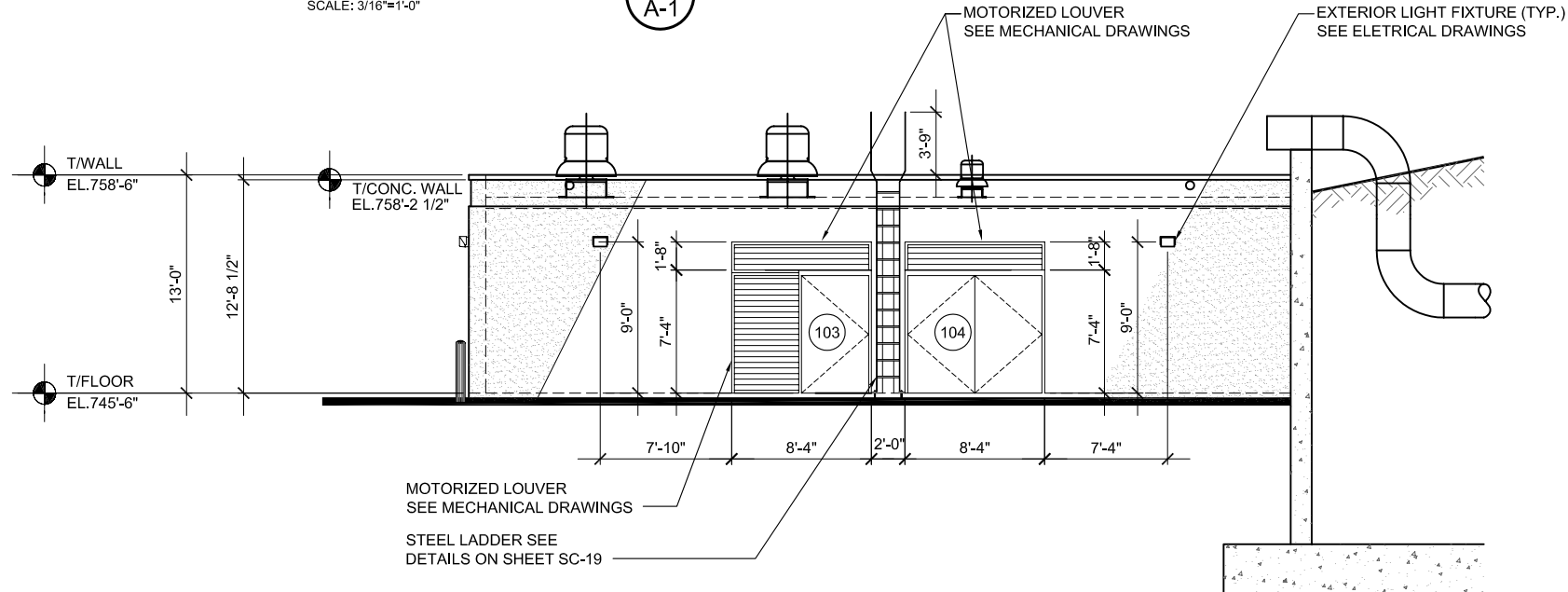
**A**  
A-1



**SERVICE BUILDING  
SOUTH ELEVATION**

SCALE: 3/16"=1'-0"

**B**  
A-1



**SERVICE BUILDING  
EAST ELEVATION**

SCALE: 3/16"=1'-0"

**C**  
A-1

REV.	DATE	DESCRIPTIONS

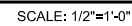
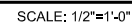
NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

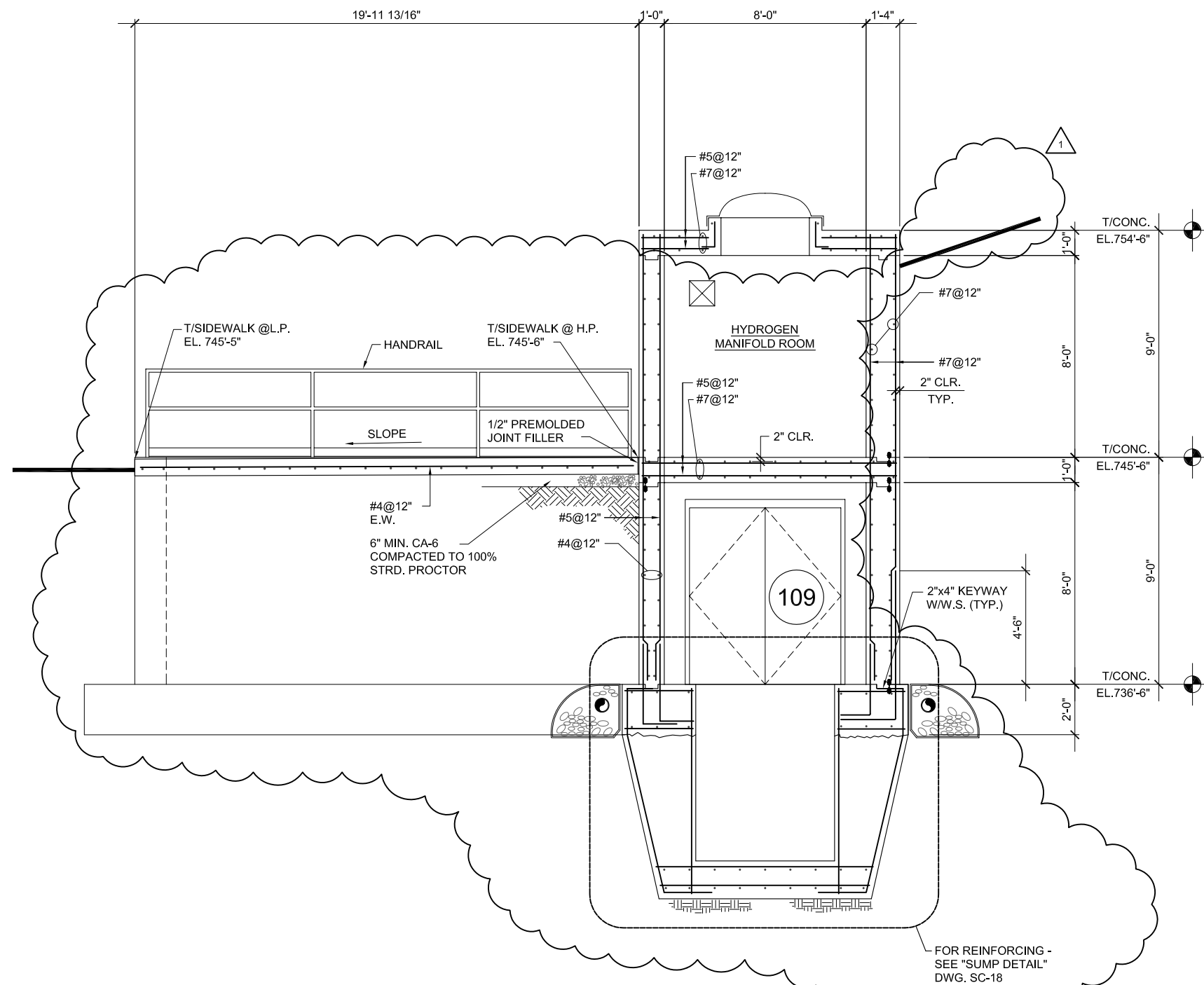

SCALE:
3/16"=1'-0"
2 0 2 4 6 8 10 12 14
SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY	
UNITED STATES DEPARTMENT OF ENERGY	
MuCOOL ENCLOSURE	
SERVICE BUILDING ELEVATIONS	
DRAWING NO. <b>4-1-35</b>	REV. <b>A-2</b>

09 SEP 2002



## 31 JAN 2003



**SECTION**  
SCALE: 3/8"=1'-0"

T  
SC-2.5

1	01/31/03	REVISED ENCLOSURE WALLS
REV.	DATE	DESCRIPTIONS
		REVISIONS


	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		


**SCALE:**

1/2"=1'-0"

3/4"=1'-0"

**FERMI NATIONAL ACCELERATOR LABORATORY**

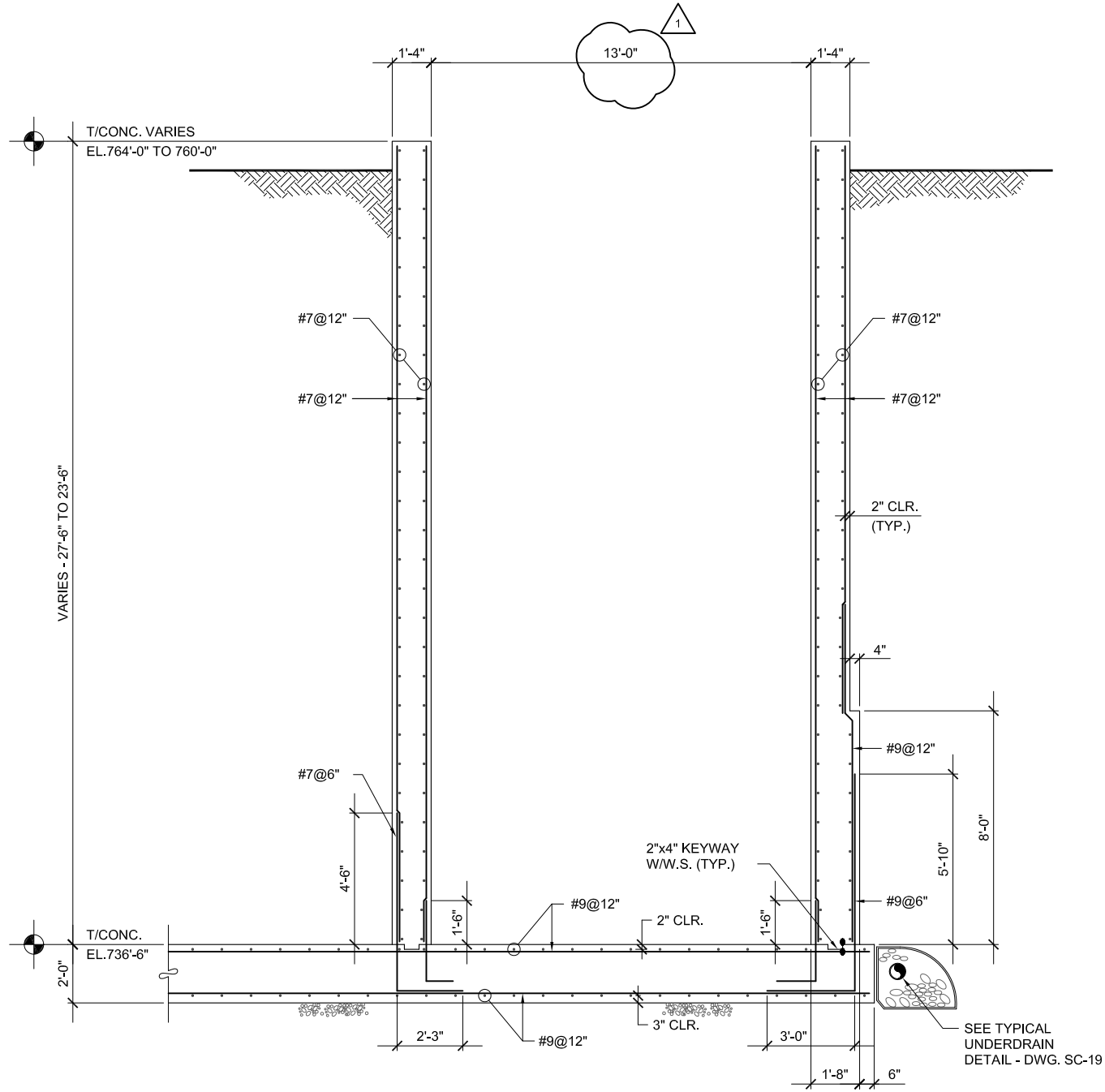
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**

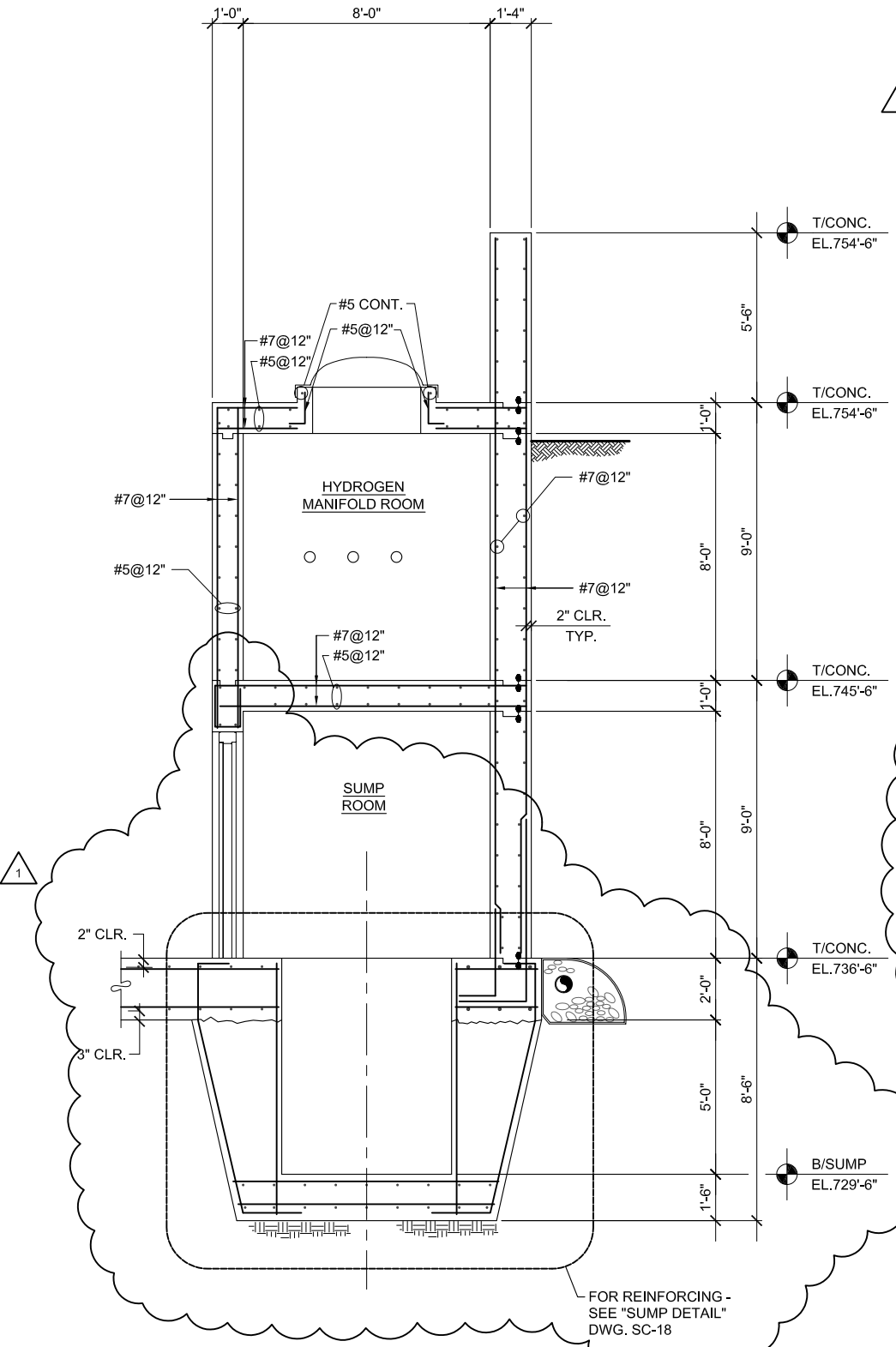
**SECTIONS AND DETAILS - SHEET 15**

DRAWING NO. **4-1-35** **SC-22** REV. **1**

31 JAN 2003



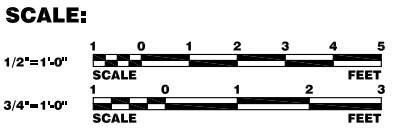
**SECTION**  
SCALE: 3/8"=1'-0"  
**R**  
SC-2.5



**SECTION**  
SCALE: 3/8"=1'-0"  
**S**  
SC-2.5

REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

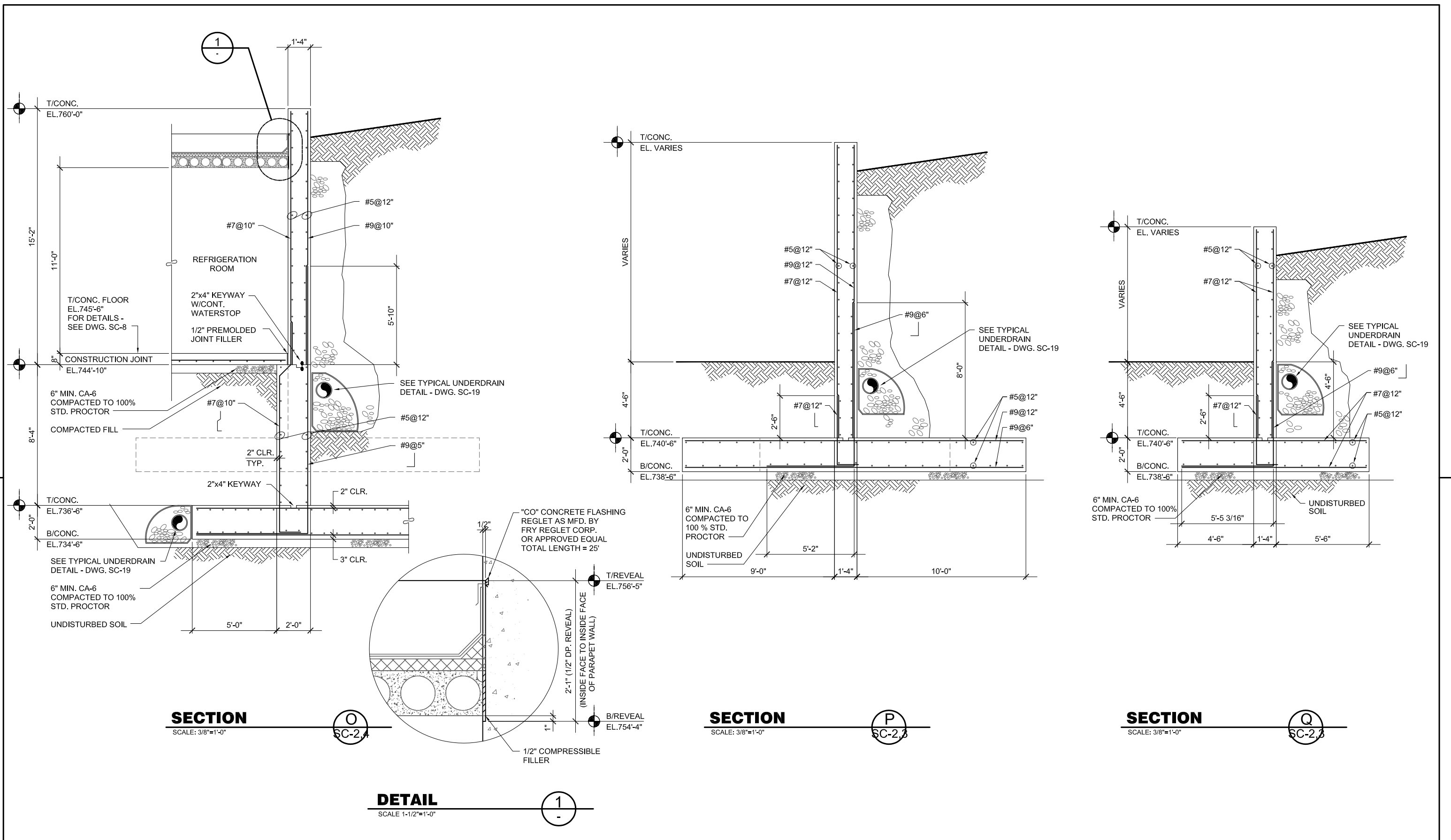
DESIGNED	NAME	DATE
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

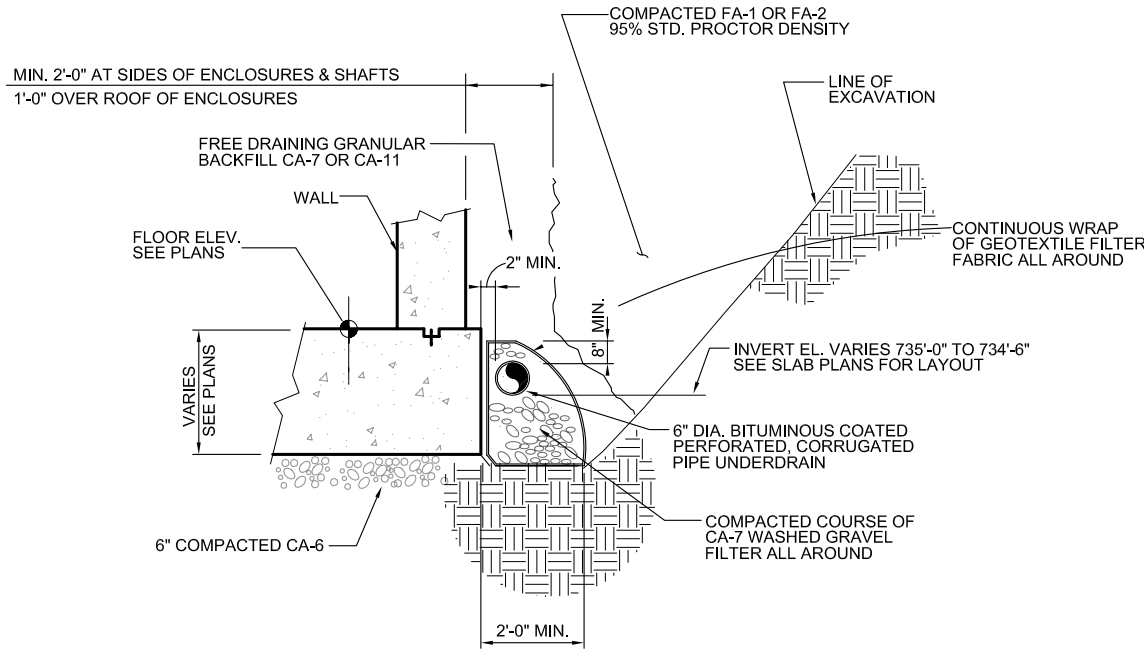


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UNITED STATES DEPARTMENT OF ENERGY

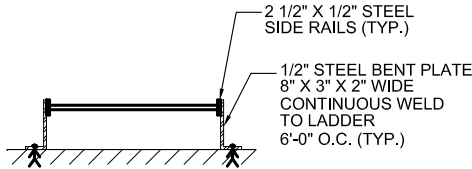
**MuCOOL ENCLOSURE**  
**SECTIONS AND DETAILS - SHEET 14**

DRAWING NO. **4-1-35** **SC-21** REV. **1**

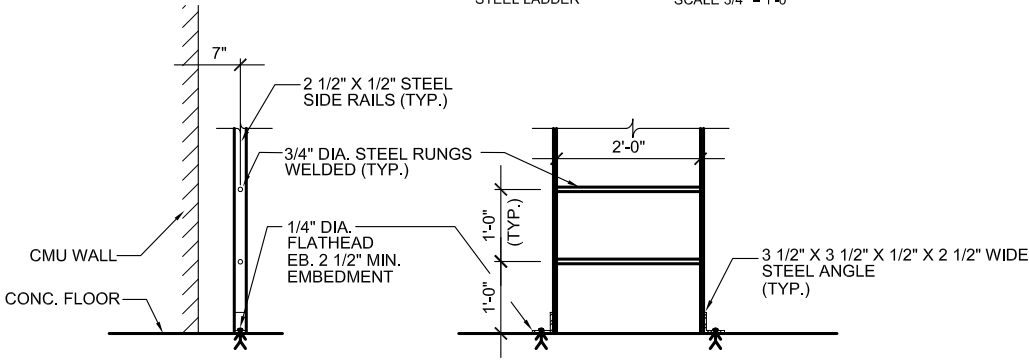




**UNDERDRAIN DETAIL  
TYPICAL**  
N.T.S.



**PLAN - LADDER**  
STEEL LADDER SCALE 3/4" = 1'-0"

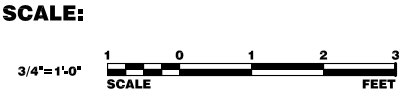


**LADDER SIDE**  
STEEL LADDER SCALE 3/4" = 1'-0"


**LADDER FRONT**  
STEEL LADDER SCALE 3/4" = 1'-0"

REV.	DATE	DESCRIPTIONS REVISIONS

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

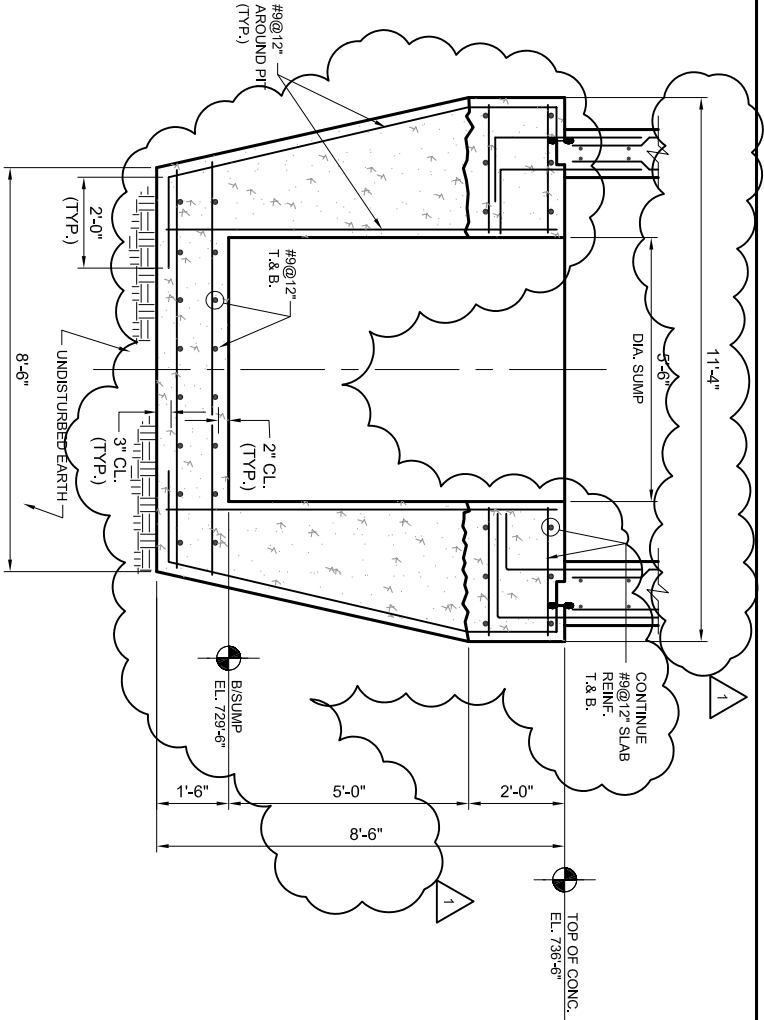
**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**  
**SECTIONS AND DETAILS - SHEET 12**

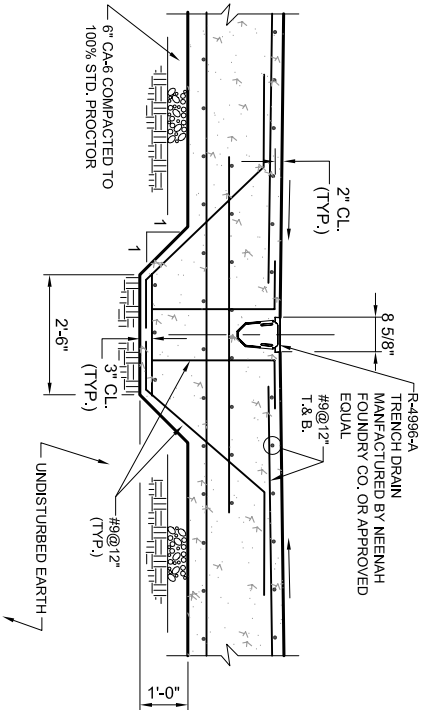
DRAWING NO. **4-1-35**

**SC-19**REV.



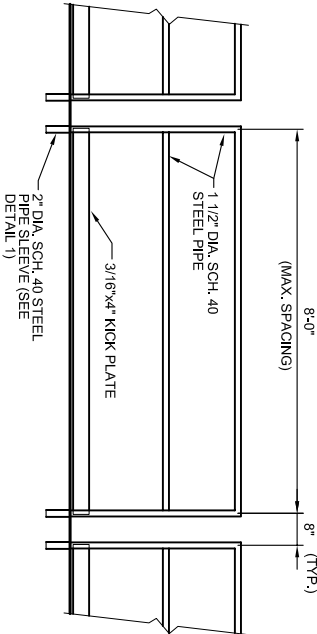
SUMP DETAIL

SCALE: 1/2"=1'-0"



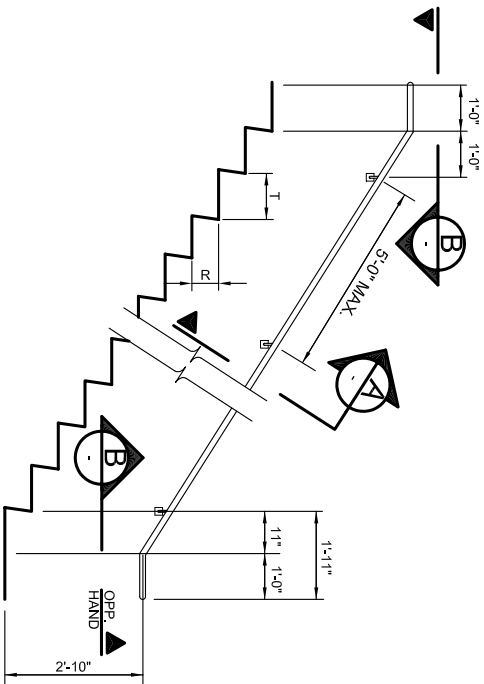
TRENCH DRAIN DETAIL

SCALE: 1/2"=1'-0"



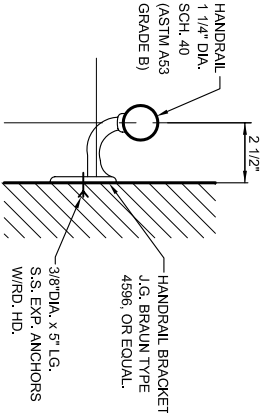
ELEVATION - REMOVABLE HANDRAIL

SCALE 1/2" = 1'-0"



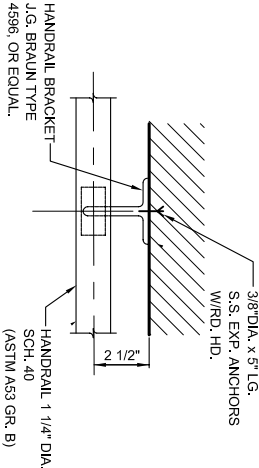
SECTION

N.T.S.



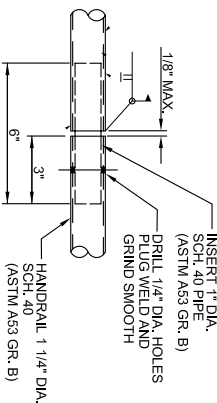
SECTION

N.T.S.



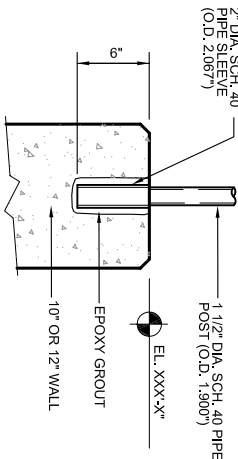
TYP. HANDRAIL SPLICE

N.T.S.



DETAIL

1 1/2" = 1'-0"



TYPICAL HANDRAIL ELEVATION

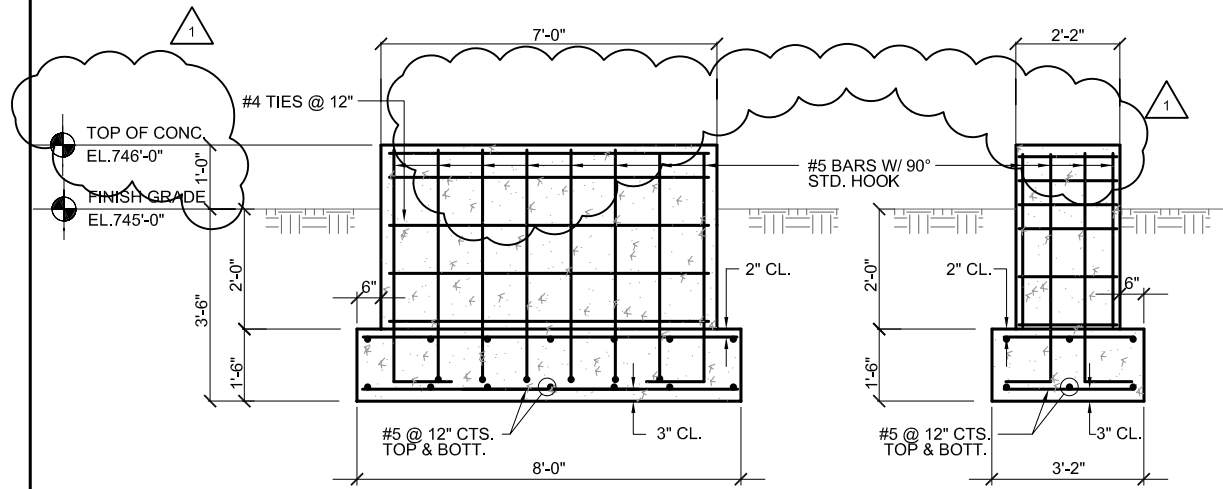
N.T.S.

REV.	DATE	DESCRIPTIONS	REVISIONS
1	01/31/03	REVISED SUMP PIT	

DESIGNED	NAME	DATE
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

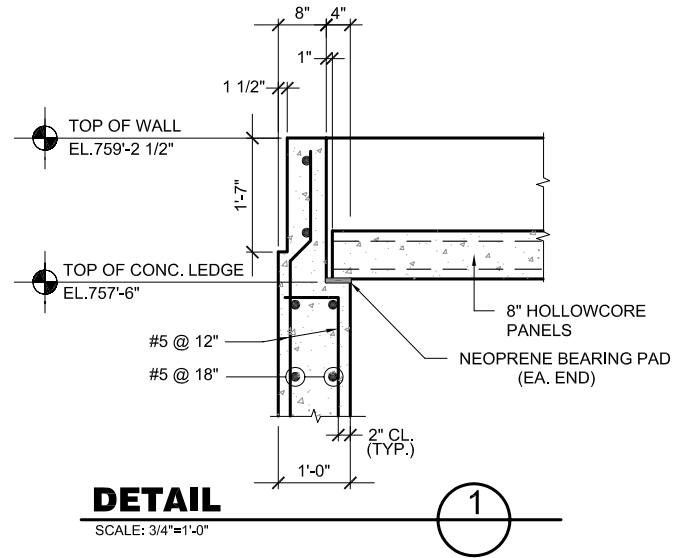
SCALE:	1/2"=1'-0"
SCALE:	1 1/2"=1'-0"
SCALE:	1 1/2"=1'-0"

FERMI NATIONAL ACCELERATOR LABORATORY	UNITED STATES DEPARTMENT OF ENERGY
MUCOOL ENCLOSURE	SECTIONS AND DETAILS - SHEET 11
4-1-35	SC-18
REV. 1	



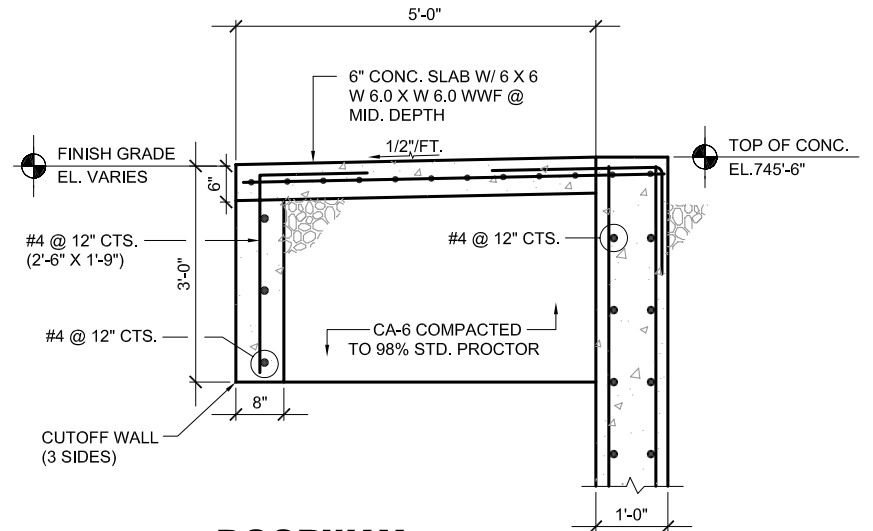
### STORAGE TANK FOUNDATION DETAILS

SCALE: 1/2"=1'-0"



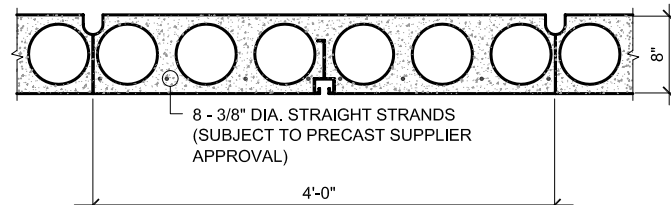
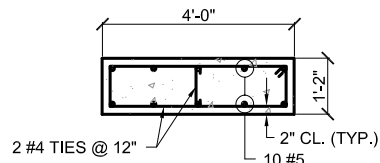
### DETAIL

SCALE: 3/4"=1'-0"



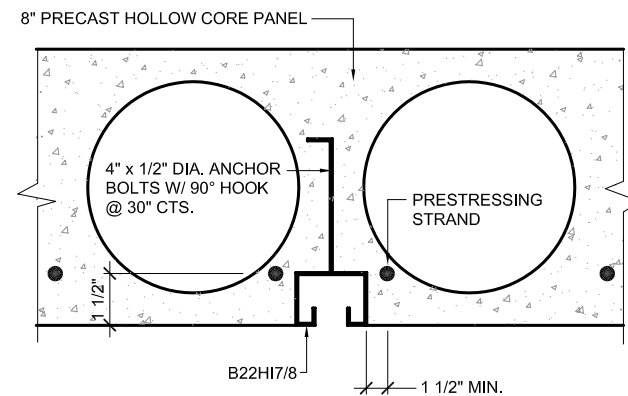
### DOORWAY SECTION

SCALE: 3/4"=1'-0"



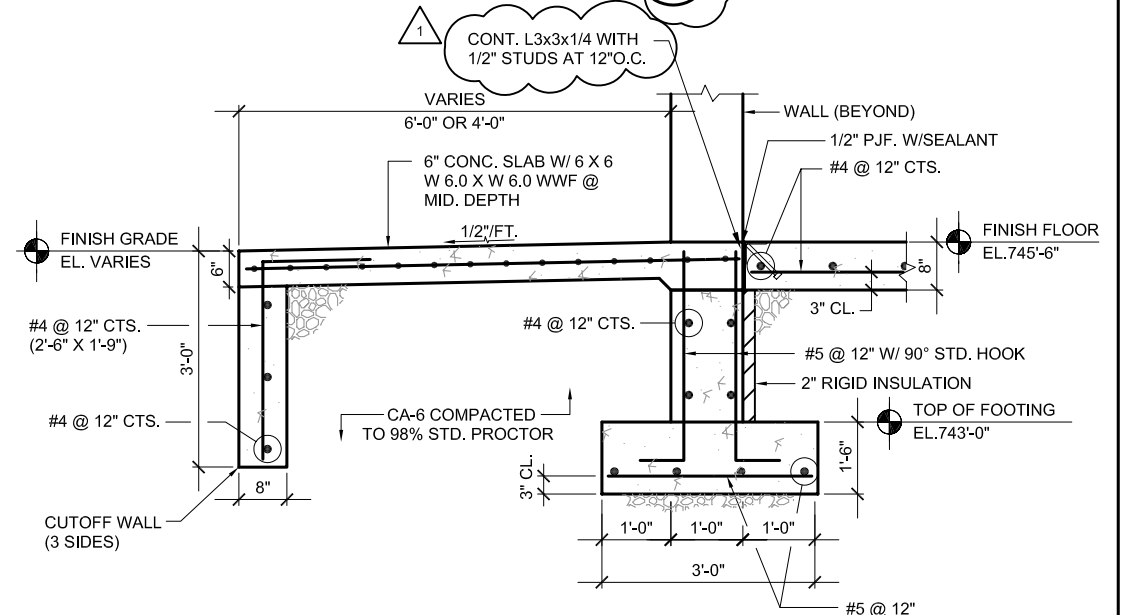
### HOLLOW CORE PANEL DETAIL

N.T.S.



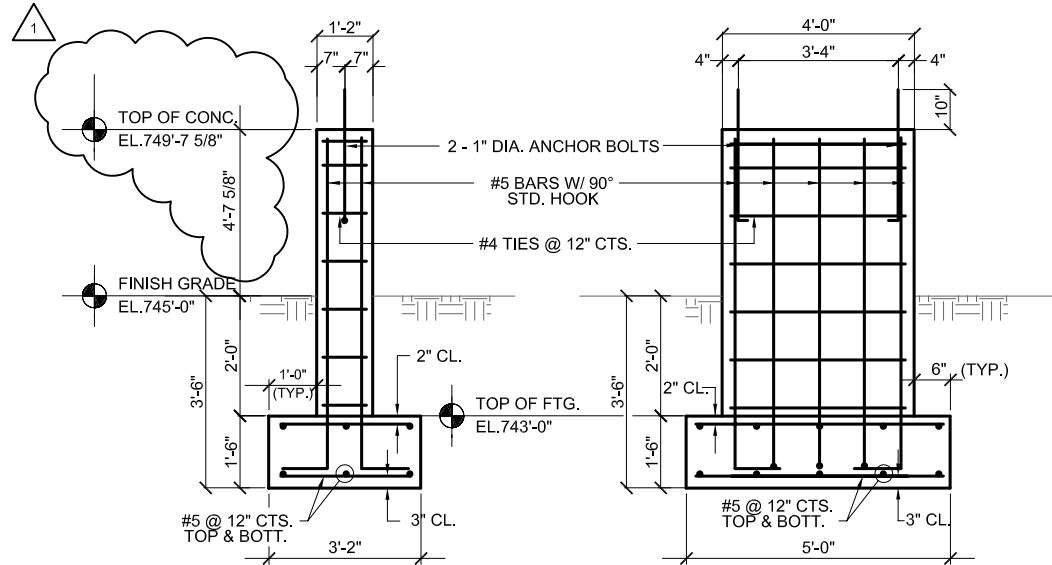
### UNISTRUT DETAIL

N.T.S.



### DOORWAY SECTION

SCALE: 3/4"=1'-0"



### HEAT EXCHANGER FOUNDATION DETAILS

SCALE: 1/2"=1'-0"

REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED TANK FDN'S
		REVISIONS

	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

SCALE:

1/2"=1'-0"

SCALE

3/4"=1'-0"

SCALE



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



MuCOOL ENCLOSURE

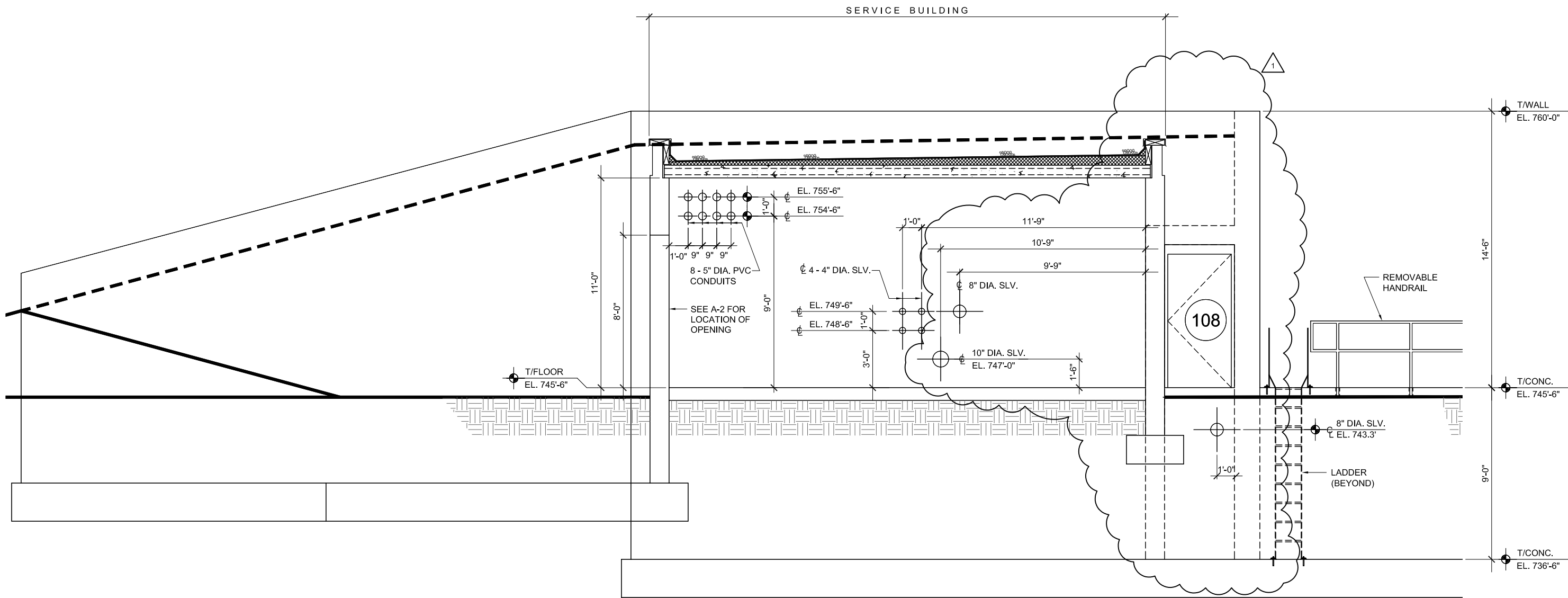
SECTIONS AND DETAILS - SHEET 10

DRAWING NO. 4-1-35

SC-17

REV. 1

31 JAN 2003



**SECTION**

SCALE: 3/8"=1'-0"

**L**  
SC-2, 3, 4

REV.	DATE	DESCRIPTIONS REVISIONS
1	01/31/03	REVISED ENCLOSURE WALLS & SLEEVES

	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

SCALE:

3/8"=1'-0"



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UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**

**SECTIONS & DETAILS - SHEET 9**

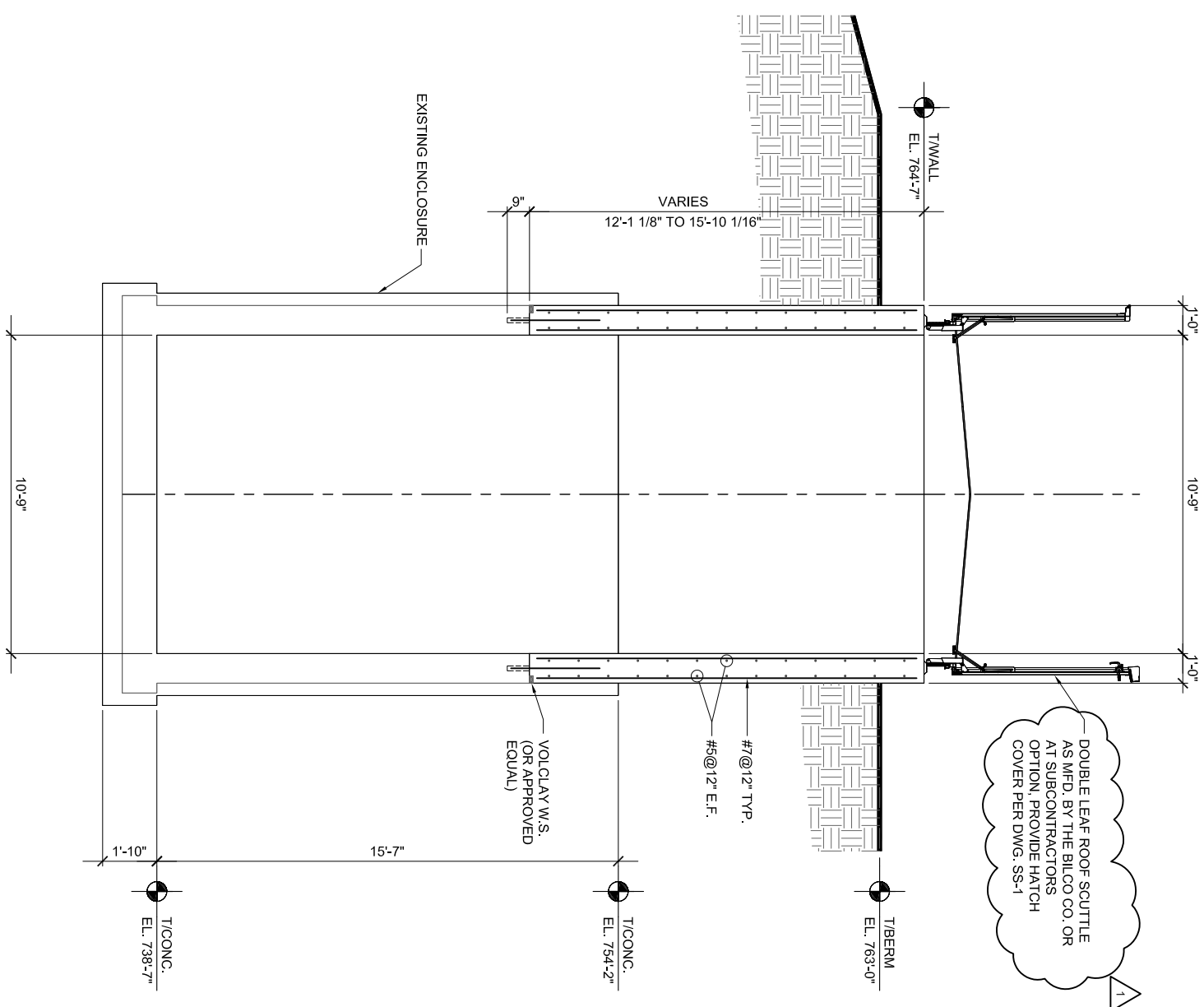
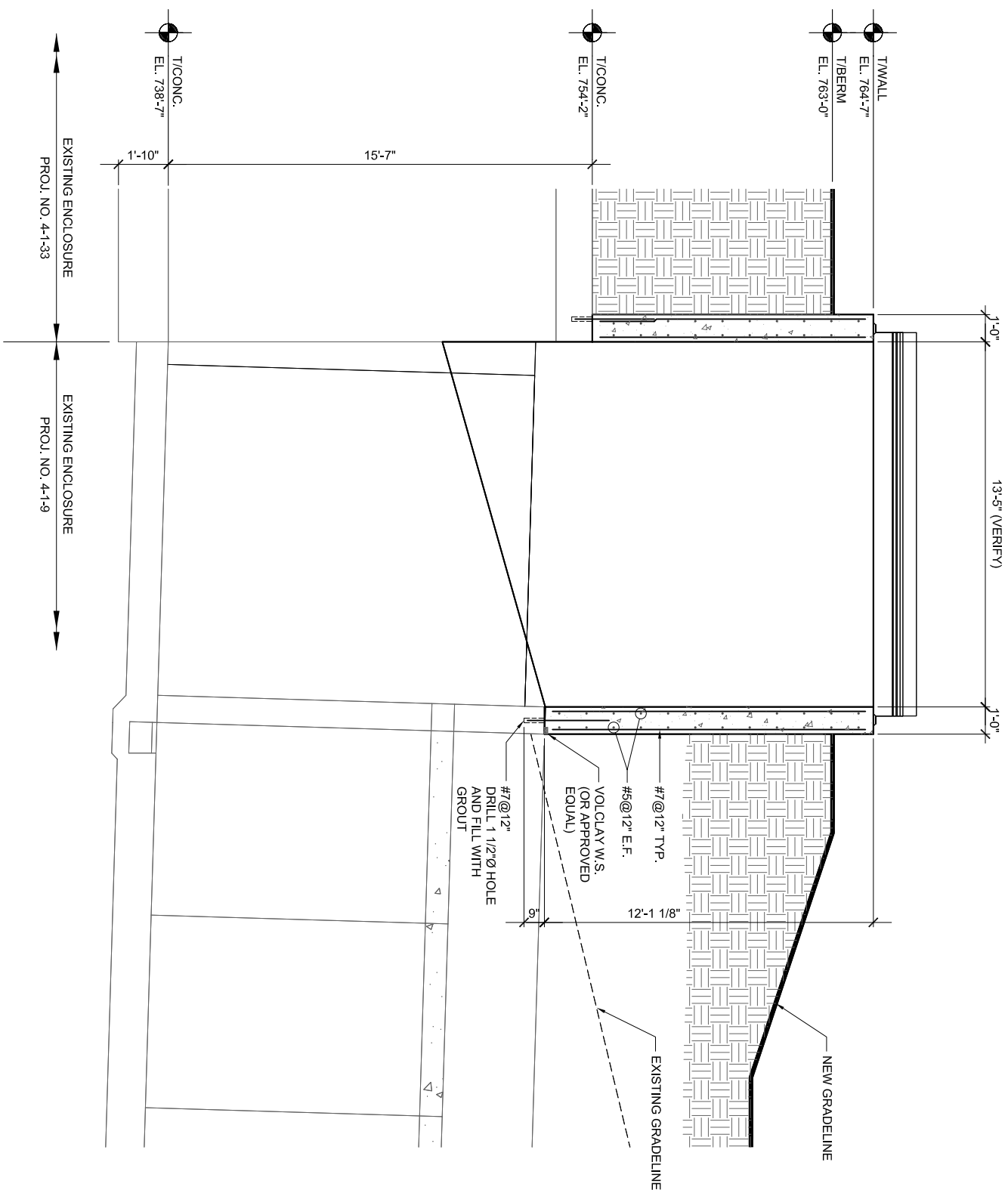
DRAWING NO.

**4-1-35**

**SC-16**

REV. 1

31 JAN 2003



## SECTION

SCALE: 3/8"=1'-0"

SC-2, 5, 6

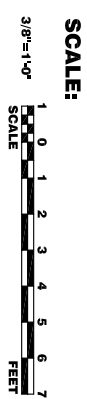
## SECTION

SCALE: 3/8"=1'-0"

SC-2, 5, 6

REV.	DATE	DESCRIPTIONS REVISIONS
2	01/31/03	VALUE ENGINEERING

	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



# MUCOOL ENCLOSURE

## SECTIONS & DETAILS - SHEET 8

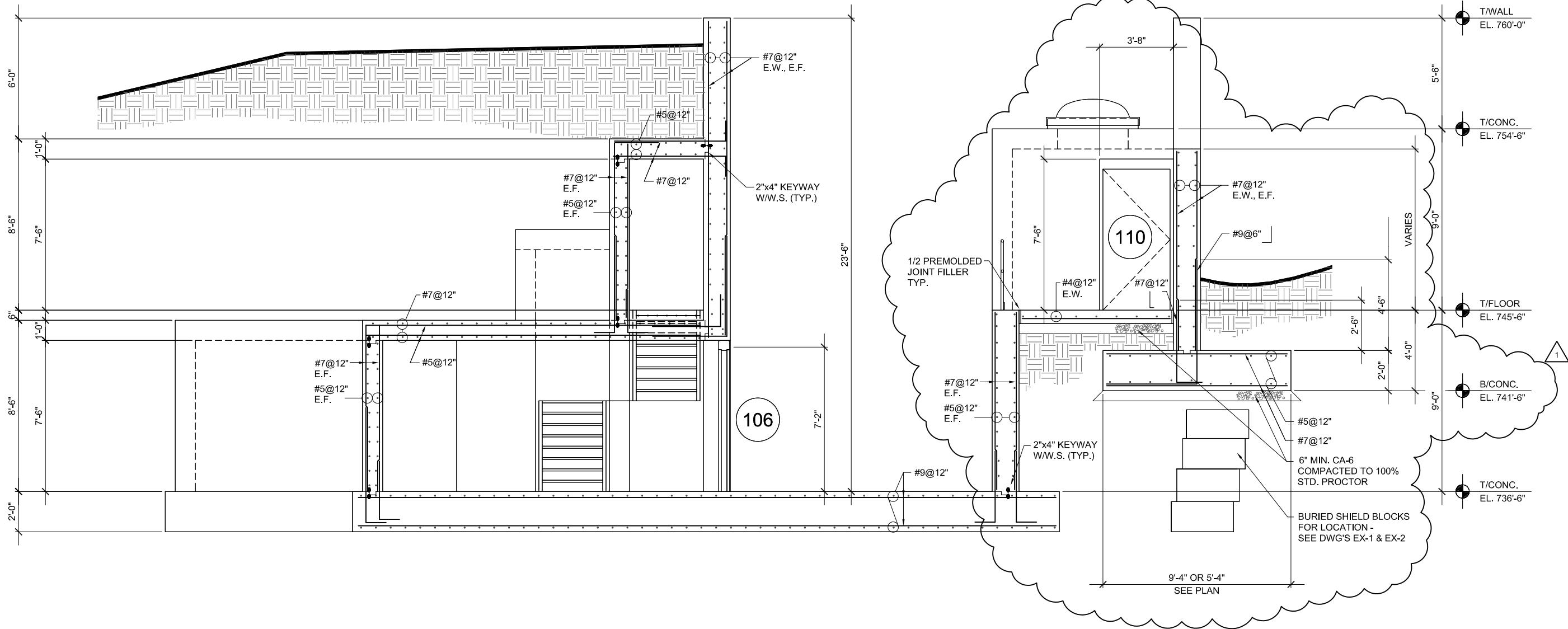
DRAWING NO.

**4-1-35**

SC-15

REV. 2

31 JAN 2003



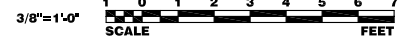
**SECTION**  
SCALE: 3/8"=1'-0"

**H**  
SC-2, 6

REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
		REVISIONS

DESIGNED	NAME	DATE
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

SCALE:



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UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**  
**SECTIONS & DETAILS - SHEET 7**

DRAWING NO. **4-1-35**

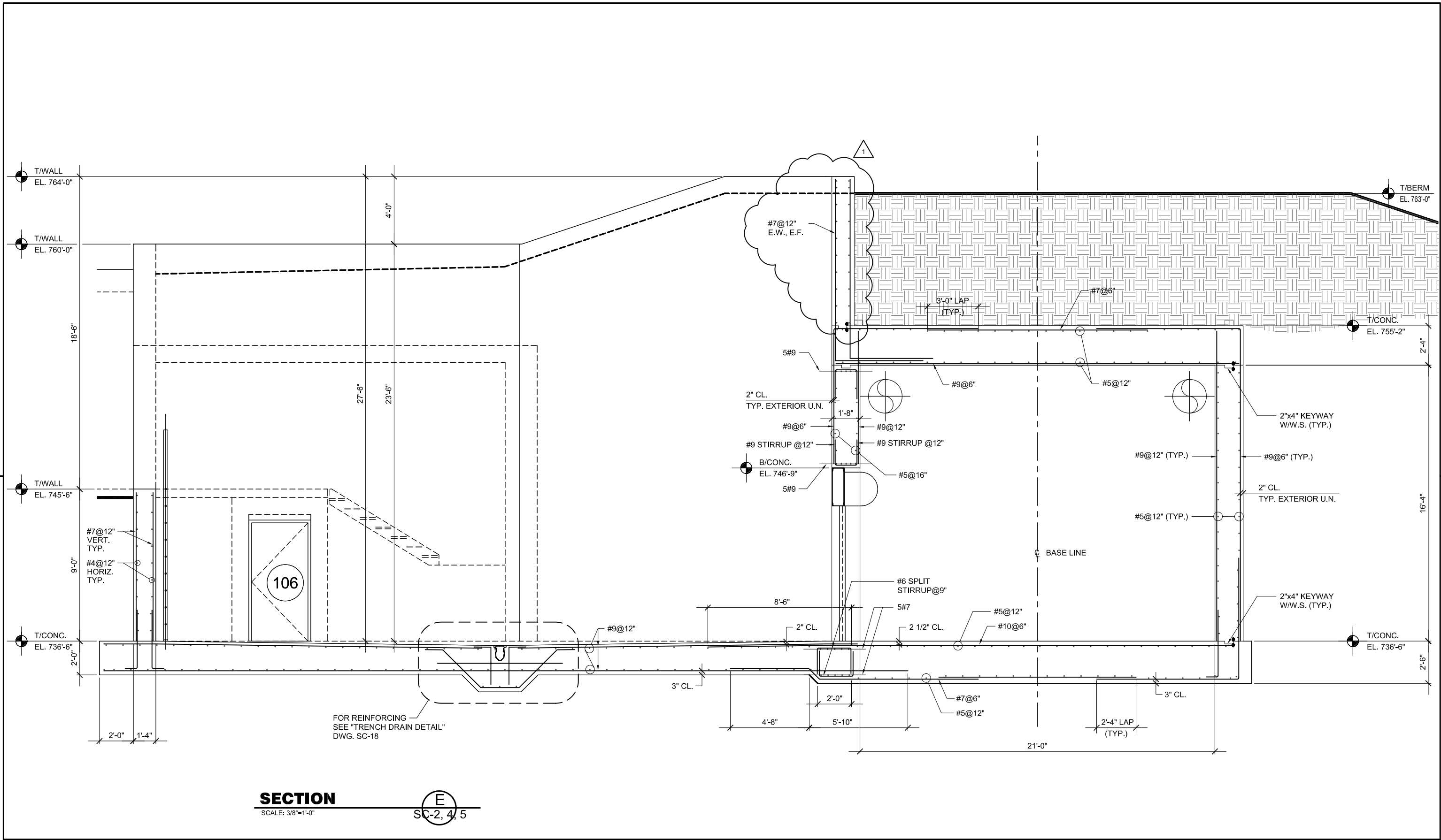
**SC-14**

REV. 1

31 JAN 2003







REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

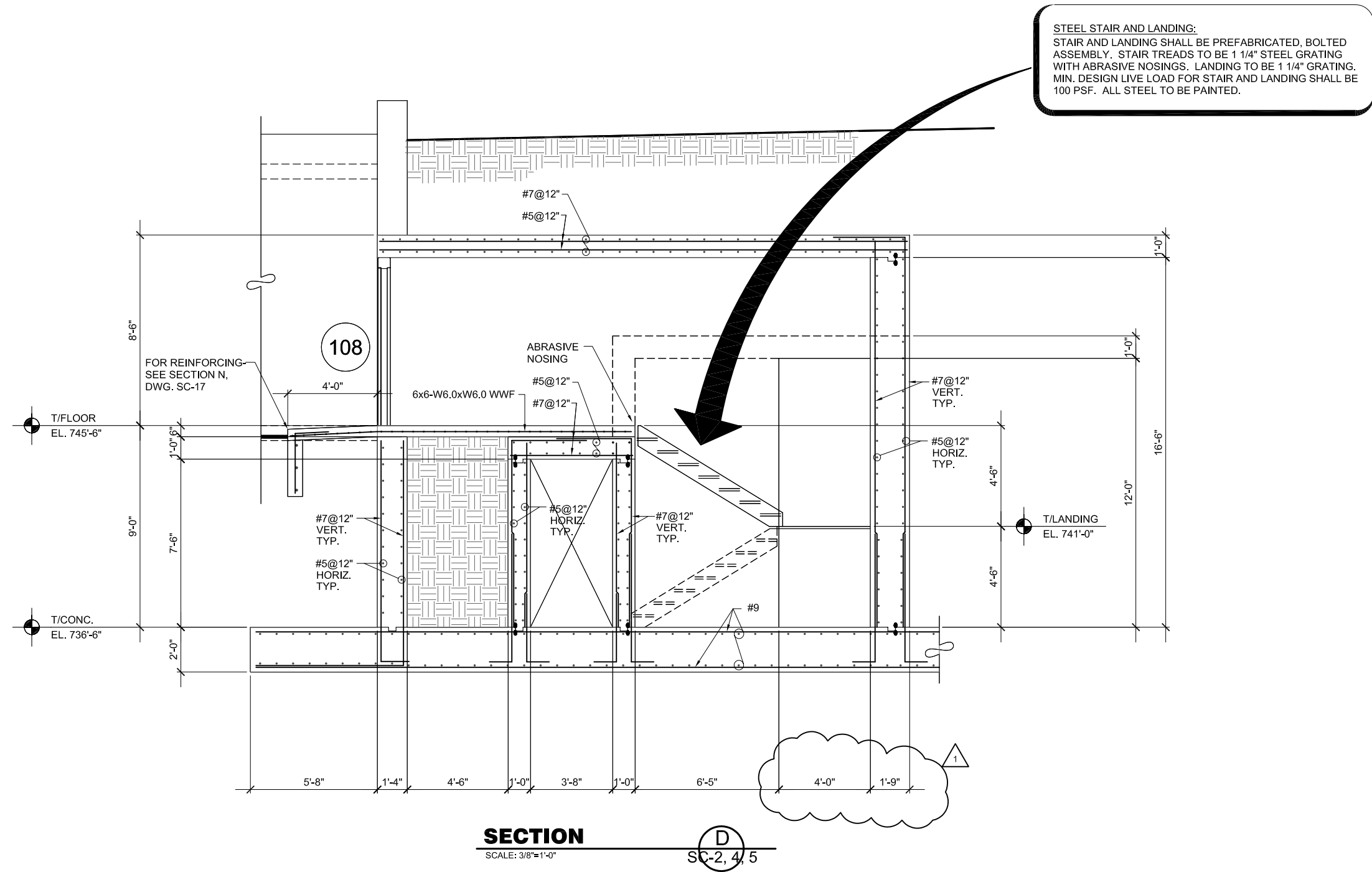

**SCALE:**  
3/8"=1'-0"

1 0 1 2 3 4 5 6 7  
SCALE FEET

**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

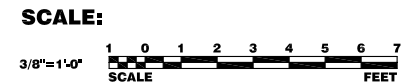
**MuCOOL ENCLOSURE**  
**SECTIONS & DETAILS - SHEET 4**

DRAWING NO. **4-1-35** **SC-11** REV. 1



1	01/31/03	REVISED ENCLOSURE WALLS
REV.	DATE	DESCRIPTIONS
		REVISIONS

	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**

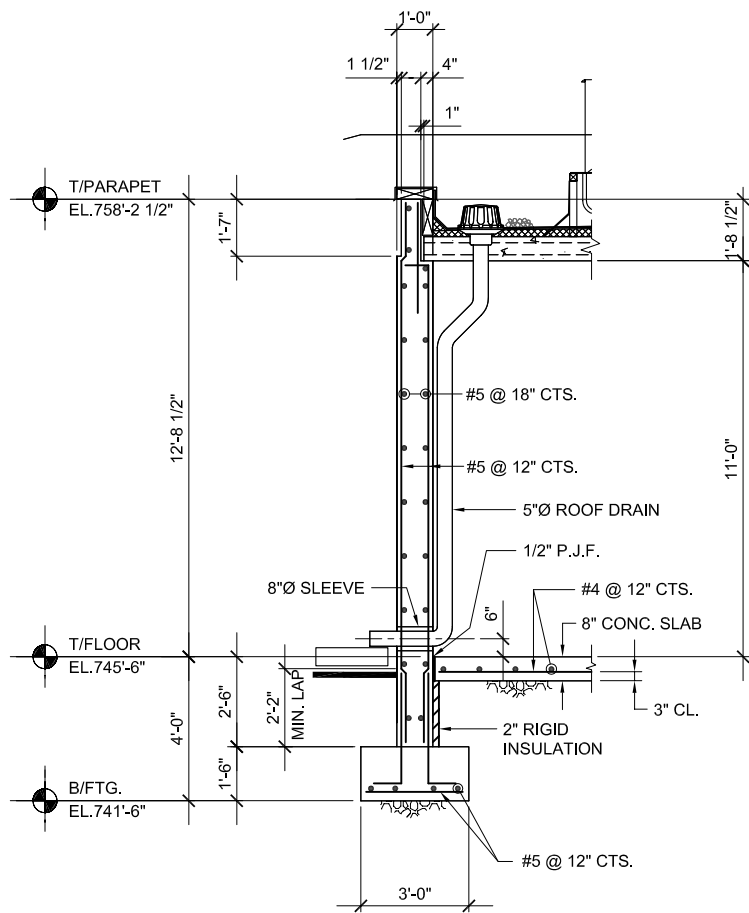
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**

**SECTIONS & DETAILS - SHEET 3**

DRAWING NO. **4-1-35** **SC-10** REV. **1**

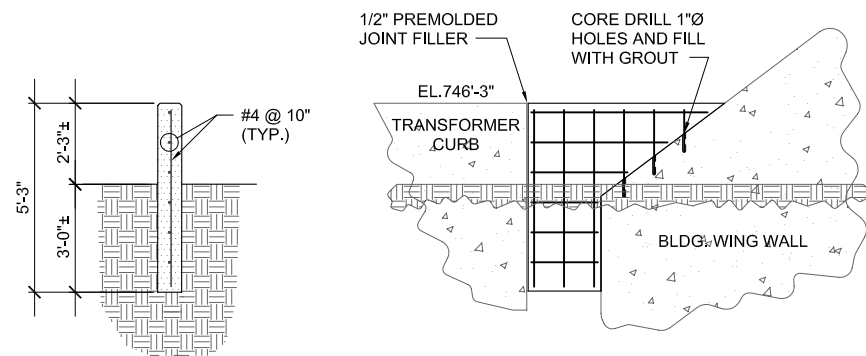




# SECTION

SCALE: 3/8"=1'-0"

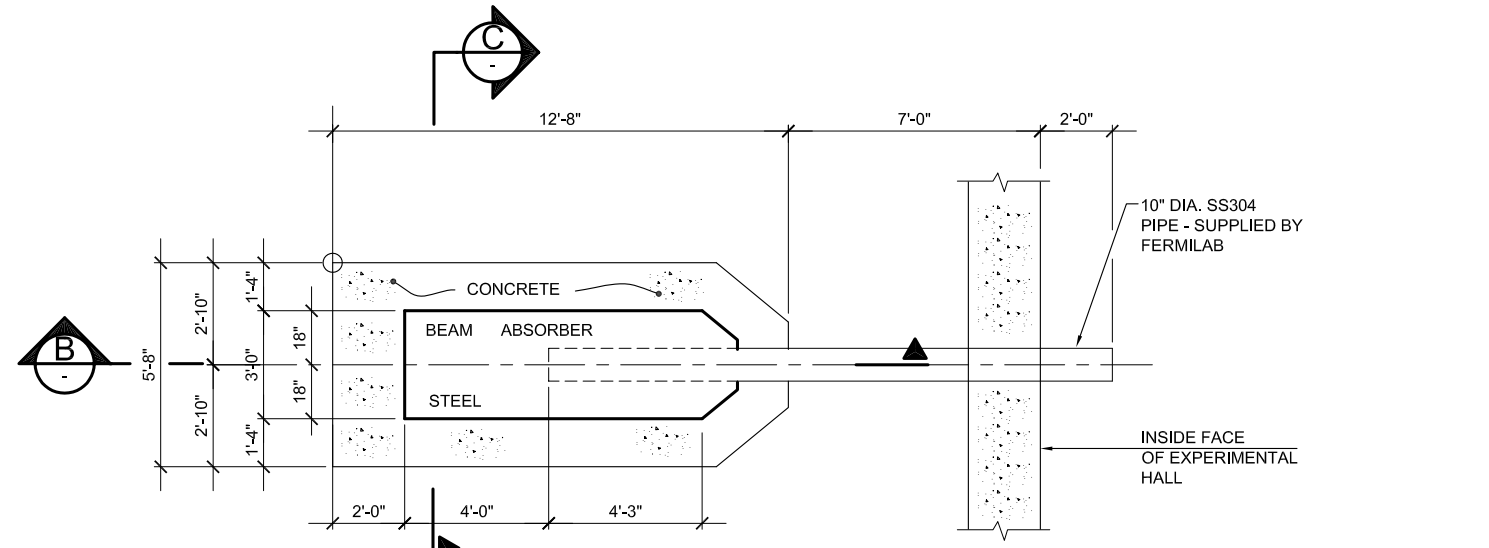
A  
SC-2, 3, 7



# CONC. CURB DETAIL

SCALE: 3/8"=1'-0"

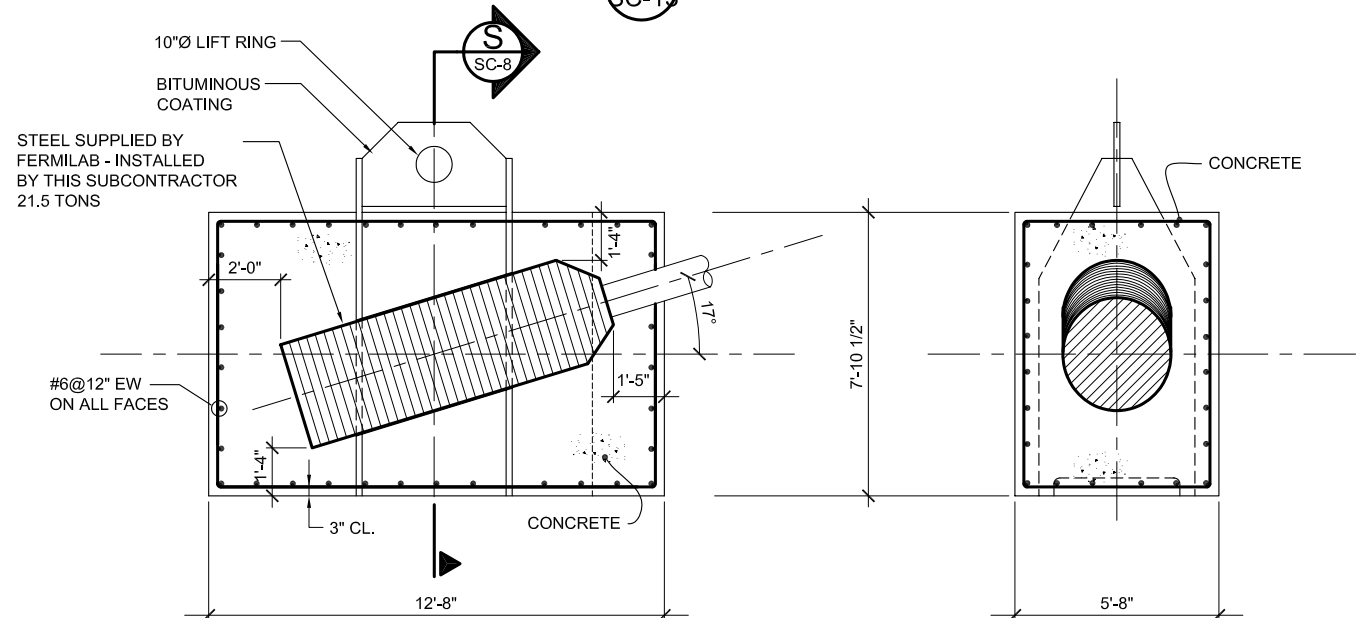
2  
C-3



# BEAM ABSORBER DETAIL

SCALE: 3/8"=1'-0"

1  
SC-13



# SECTION

SCALE: 3/8"=1'-0"

B  
-

# SECTION

SCALE: 3/8"=1'-0"

C  
-

REV.	DATE	DESCRIPTIONS

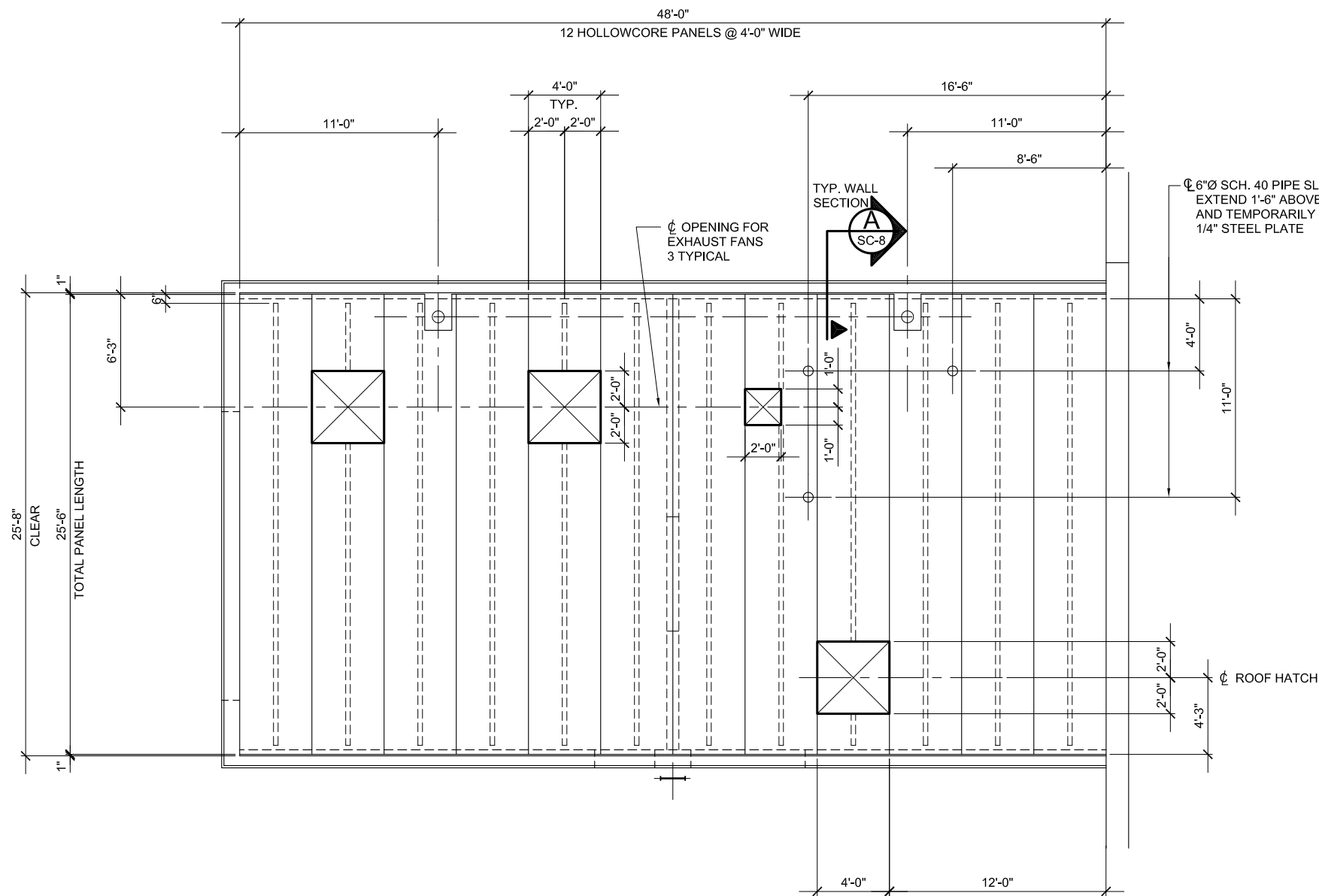
NAME	DATE
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APPROVED	
SUBMITTED	

SCALE:
3/8"=1'-0"

SCALE:
1 0 1 2 3 4 5 6 7 SCALE FEET

FERMI NATIONAL ACCELERATOR LABORATORY	
UNITED STATES DEPARTMENT OF ENERGY	
MuCOOL ENCLOSURE SECTIONS & DETAILS - SHEET 1	
DRAWING NO. 4-1-35	SC-8
REV.	

09 SEP 2002



REV.	DATE	DESCRIPTIONS REVISIONS


	NAME	DATE
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SUBMITTED		


**SCALE:**

1/4"=1'-0"

4 0 4 8

SCALE FEET

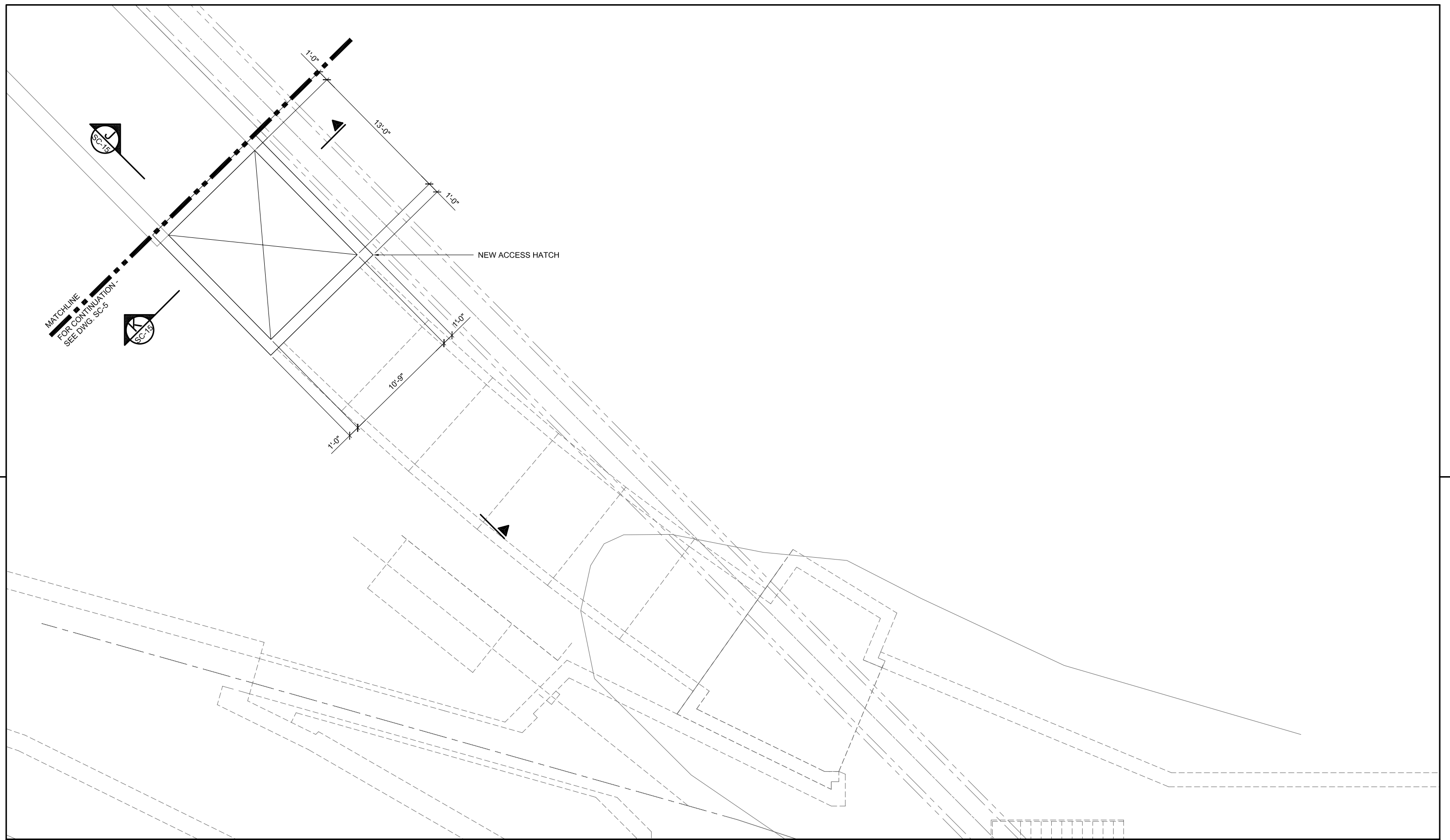
**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

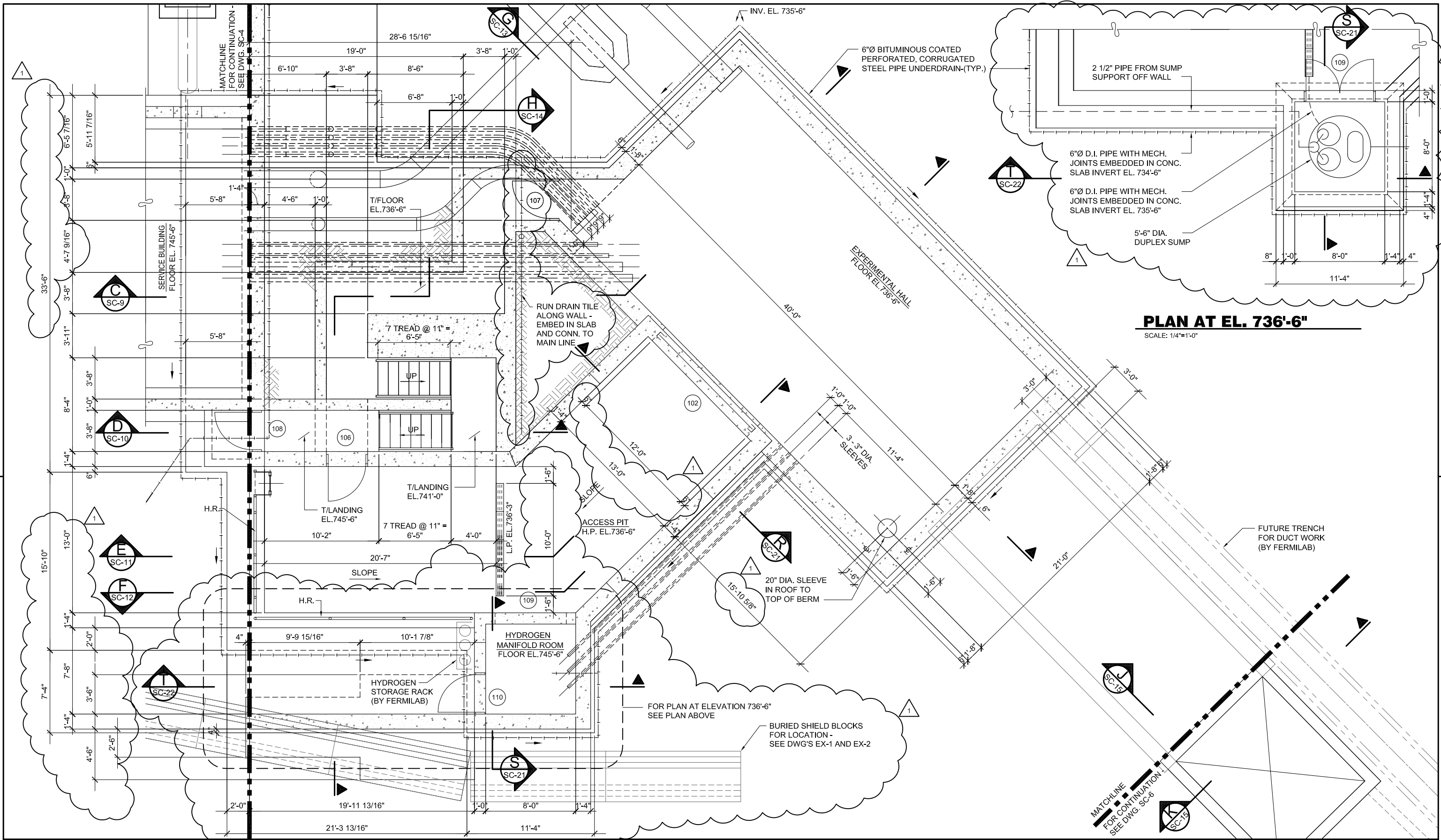
**MuCOOL ENCLOSURE**

**ROOF PLAN**

DRAWING NO. **4-1-35** **SC-7** REV.



			NAME			DATE			<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><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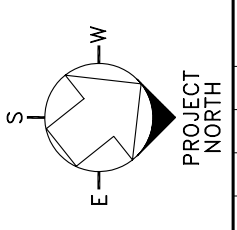


**PLAN AT EL. 736'-6"**

SCALE: 1/4"=1'-0"

REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	



SCALE:



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**

**ENLARGED PLAN - SHEET 3**

DRAWING NO. **4-1-35**

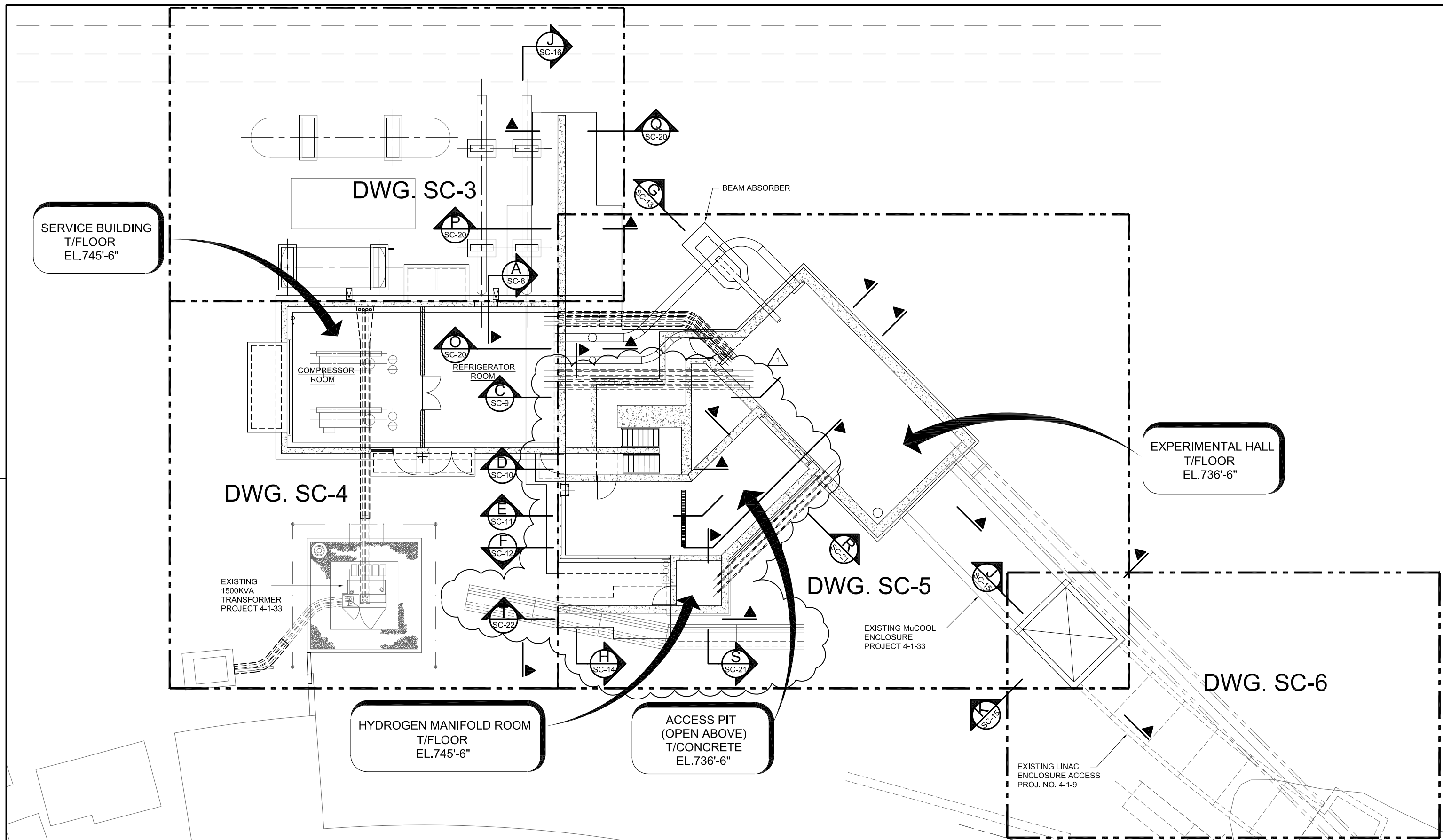
**SC-5**

REV. 1

31 JAN 2003



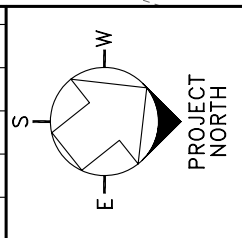




REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

NAME	DATE
DESIGNED	
DRAWN	
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APPROVED	
SUBMITTED	



SCALE:	1/8"=1'-0"
SCALE	FEET
8	0
8	16

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**

**OVERALL STRUCTURAL PLAN**

DRAWING NO. **4-1-35**

**SC-2**

REV. 1

1. DESIGN LOADS - BOCA NATIONAL BUILDING CODE, 1999.  
 ROOF LIVE LOAD-SNOW-  

BASIC GROUND SNOW LOAD	30 P.S.F. (MIN.)
IMPORTANCE FACTOR	1.0

 ROOFING DEAD LOAD 30 P.S.F.  
 LATERAL LOAD    WIND  

BASIC WIND SPEED	80 M.P.H.
IMPORTANCE FACTOR	EXPOSURE C 1.0

 SEISMIC  

SEISMIC PERFORMANCE CATEGORY	A
VELOCITY RELATED ACCEL. ( $A_v$ )	0.05g
SOIL PROFILE COEFFICIENT	1.2

 MASONRY WALL DEAD LOAD                      8" CMU 60 P.S.F.  
 ALLOWABLE SOIL PRESSURE - SHALLOW FOUNDATIONS 3,000 P.S.F.
2. THE SUBCONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION. NOTIFY THE FERMLAB CONSTRUCTION COORDINATOR OF ANY DISCREPANCY IMMEDIATELY.
3. VERIFY DRAWINGS FOR LOCATION OF ALL OPENINGS IN WALLS AND SLABS.
4. ALL FILL OR BACKFILL WITHIN THE LIMITS OF A BUILDING OR A STRUCTURE SHALL BE COMPACTED ACCORDING TO THE SPECIFICATIONS.
5. UNLESS OTHERWISE INDICATED, ALL MISCELLANEOUS ANGLES, WIDE FLANGES SECTIONS, ETC. SHALL BE ASTM A-36.
6. SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUACY OF TEMPORARY SHORING TO RESIST ALL LOADING CONDITIONS DURING CONSTRUCTION.
7. THE SUBCONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AT ALL TIMES. COSTS OF TEMPORARY CULVERTS, DITCHES, PUMPS OR OTHER ITEMS REQUIRED TO MAINTAIN POSITIVE DRAINAGE SHALL BE INCIDENTAL TO THE CONTRACT.

1. IT SHALL BE THE RESPONSIBILITY OF THE SUBCONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURES IN THE FIELD PRIOR TO CONSTRUCTION AND ORDERING MATERIALS. DO NOT SCALE DIMENSIONS FROM DRAWINGS.
2. PLAN DIMENSIONS AND DETAILS RELATIVE TO EXISTING STRUCTURES HAVE BEEN TAKEN FROM EXISTING PLANS AND ARE SUBJECT TO NOMINAL CONSTRUCTION VARIATIONS. IT SHALL BE THE SUBCONTRACTOR'S RESPONSIBILITY TO VERIFY SUCH DIMENSIONS AND DETAILS IN THE FIELD AND MAKE NECESSARY APPROVED ADJUSTMENTS PRIOR TO CONSTRUCTION OR ORDERING OF MATERIALS. SUCH VARIATIONS SHALL NOT BE CAUSE FOR ADDITIONAL COMPENSATION FOR A CHANGE IN THE SCOPE OF WORK.
3. IF, DURING THE PERFORMANCE OF THE WORK, THE SUBCONTRACTOR FINDS A CONFLICT OR DISCREPANCY RELATED TO EXISTING DETAILS AND DIMENSIONS OF THE EXISTING STRUCTURE, THE SUBCONTRACTOR SHALL REPORT SUCH DISCREPANCIES TO THE FERMILAB CONSTRUCTION COORDINATOR AT ONCE, AND BEFORE PROCEEDING WITH THE WORK AFFECTED HEREBY, SUBCONTRACTOR SHALL OBTAIN WRITTEN INTERPRETATION OR CLARIFICATION OF SUCH DISCREPANCIES.

1. ALL FOOTING EXCAVATIONS SHALL BE CLEAN AND FREE OF DEBRIS, STANDING WATER AND LOOSE SOIL AND SHALL BE INSPECTED BY THE FERMILAB CONSTRUCTION COORDINATOR PRIOR TO PLACEMENT OF CONCRETE.
2. IN STRUCTURAL AREAS (WHERE STRUCTURES DERIVE SOME OR ALL SUPPORT FROM FILL-SUPPORTED FOUNDATIONS) AND SLABS-ON-GRADE, FILL SHALL BE COMPACTED TO 98 PERCENT OF STD. PROCTOR MAXIMUM DRY DENSITY (ASTM D-698), UNLESS OTHERWISE SPECIFIED.
3. ALL FILL MATERIAL SHALL BE APPROVED FOR USE BY THE FERMILAB CONSTRUCTION COORDINATOR IN ADVANCE OF PLACEMENT. NO FILL SHALL BE PLACED OVER FROZEN, MUDDY OR OTHER DELETERIOUS MATERIAL. LIFT THICKNESS SHALL BE MINIMIZED TO ALLOW EFFICIENT COMPACTION. NO FILL MAY BE PLACED OVER A PREVIOUS LIFT THAT HAS NOT BEEN ADEQUATELY COMPACTED AND HAS NOT BEEN ACCEPTED BY THE FERMILAB CONSTRUCTION COORDINATOR.
4. BACKFILL AGAINST GRADE WALLS SHALL BE PLACED EVENLY ON ALL SIDES.
5. A LEAN CONCRETE MUD SLAB 3 TO 4 IN. THICK SHALL BE USED IN THE FOOTING EXCAVATION IF THE BOTTOM OF THE EXCAVATION TENDS TO BECOME MUDDY AND SOFT DUE TO CONSTRUCTION ACTIVITY. LEAN CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2,000 P.S.I.

1. ALL CAST-IN-PLACE CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 P.S.I.
2. ALL REINFORCEMENT BARS SHALL CONFORM TO ASTM-A615, GRADE 60.
3. ALL WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185. (FLAT STOCK ONLY)
4. ALL CONCRETE WORK SHALL CONFORM TO ACI 318-99 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" AND ACI 301 "SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS." ALL REINFORCING DETAILS NOT SHOWN SHALL CONFORM TO ACI 315 "DETAILING MANUAL," LATEST EDITION.
5. REINFORCING BAR LAP SPLICES SHALL BE CLASS "B" SPLICES UNLESS SHOWN OTHERWISE ON THE DRAWINGS. MECHANICAL SPLICES MAY BE USED IN LIEU OF LAP SPLICES. MECHANICAL SPLICES SHALL DEVELOP IN TENSION OR COMPRESSION, AT LEAST 125 PERCENT OF THE SPECIFIED YIELD STRENGTH,  $F_y$  OF THE BAR. THE SUBCONTRACTOR SHALL SUBMIT TO THE FERMLAB CONSTRUCTION COORDINATOR MANUFACTURER'S LITERATURE, PRODUCT SAMPLES AND CERTIFIED TEST REPORTS PRIOR TO RECEIVING APPROVAL OF THE MECHANICAL SPLICES. LOCATIONS OF THE MECHANICAL BAR SPLICES SHALL BE SHOWN ON THE REINFORCING STEEL SHOP DRAWINGS.
6. CONTINUOUS TOP AND BOTTOM BARS, WHEN SHOWN IN SECTIONS ONLY, SHALL BE LAPPED AS FOLLOWS: TOP BARS NEAR MIDSPAN, BOTTOM BARS DIRECTLY OVER SUPPORTS.
7. CONCRETE PROTECTION (MINIMUM CONCRETE COVER) FOR REINFORCEMENT SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
  - A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH, 3"
  - B. CONCRETE EXPOSED TO EARTH OR WEATHER, 2"
  - C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND
    1. SLABS 3/4 "
    2. WALLS, BEAMS, COLUMNS, PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS 1 1/2 "
8. ALL REINFORCEMENT BARS SHALL BE CLEAN AND FREE OF GREASE, SCALING RUST, AND OTHER FOREIGN MATERIALS.
9. AT CONSTRUCTION JOINTS SHOWN ON THE PLANS, WHERE DOWELS WILL PENETRATE CONSTRUCTION FORMWORK, THE SUBCONTRACTOR MAY USE A MANUFACTURED DOWEL BAR SUBSTITUTION SYSTEM WHEN APPROVED IN WRITING BY THE FERMLAB CONSTRUCTION COORDINATOR. THE SUBCONTRACTOR SHALL SUBMIT MANUFACTURER'S LITERATURE, PRODUCT SAMPLES AND CERTIFIED TEST REPORTS TO THE FERMLAB CONSTRUCTION COORDINATOR FOR APPROVAL. THE SUBCONTRACTOR SHALL ALSO INCLUDE INFORMATION ON WHERE HE PROPOSES TO USE THEM. TEST REPORTS SHOW YIELD AND ULTIMATE TENSILE LOAD CAPACITIES.
10. TWO #5 BARS, EACH FACE, SHALL BE PROVIDED DIAGONALLY AT ALL RE-ENTRANT CORNERS. BARS SHALL BE EXTENDED 24 INCHES (MIN.) BEYOND CORNERS OF THE OPENING.
11. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
12. NO CONSTRUCTION JOINTS, EXCEPT THOSE SHOWN ON THE PLANS, WILL BE ALLOWED EXCEPT THOSE SUBMITTED BY THE SUBCONTRACTOR IN WRITING AND APPROVED BY THE FERMLAB CONSTRUCTION COORDINATOR.
13. ALL EXPOSED EDGES AND EQUIPMENT PADS SHALL BE CHAMFERED 3/4"

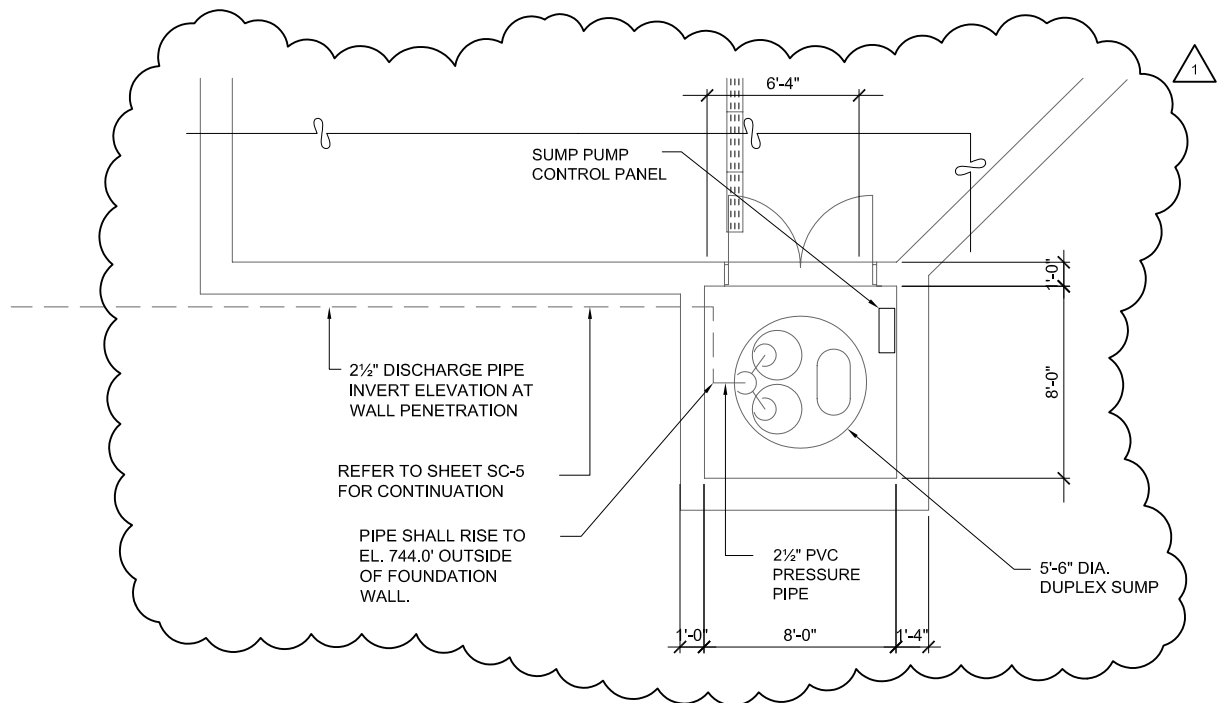
* CLASS "B" SPLICE				
f <sub>c</sub> = 4,000 PSI    f <sub>y</sub> = 60,000 PSI				
SIZE	UNCOATED BARS		EPOXY COATED BARS	
	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS
#4	1'-7"	2'-0"	1'-11"	2'-5"
#5	1'-11"	2'-6"	2'-4"	3'-0"
#6	2'-4"	3'-0"	2'-10"	3'-8"
#7	2'-9"	3'-6"	3'-4"	4'-3"
#8	3'-3"	4'-3"	3'-11"	5'-2"
#9	4'-2"	5'-4"	5'-0"	6'-5"
#10	5'-3"	6'-10"	6'-4"	8'-3"
#11	6'-5"	8'-4"	7'-9"	10'-0"

**NOTE:**  
TOP BARS CONSIST OF HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE SPLICE.

\* PER ACI 318-99 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

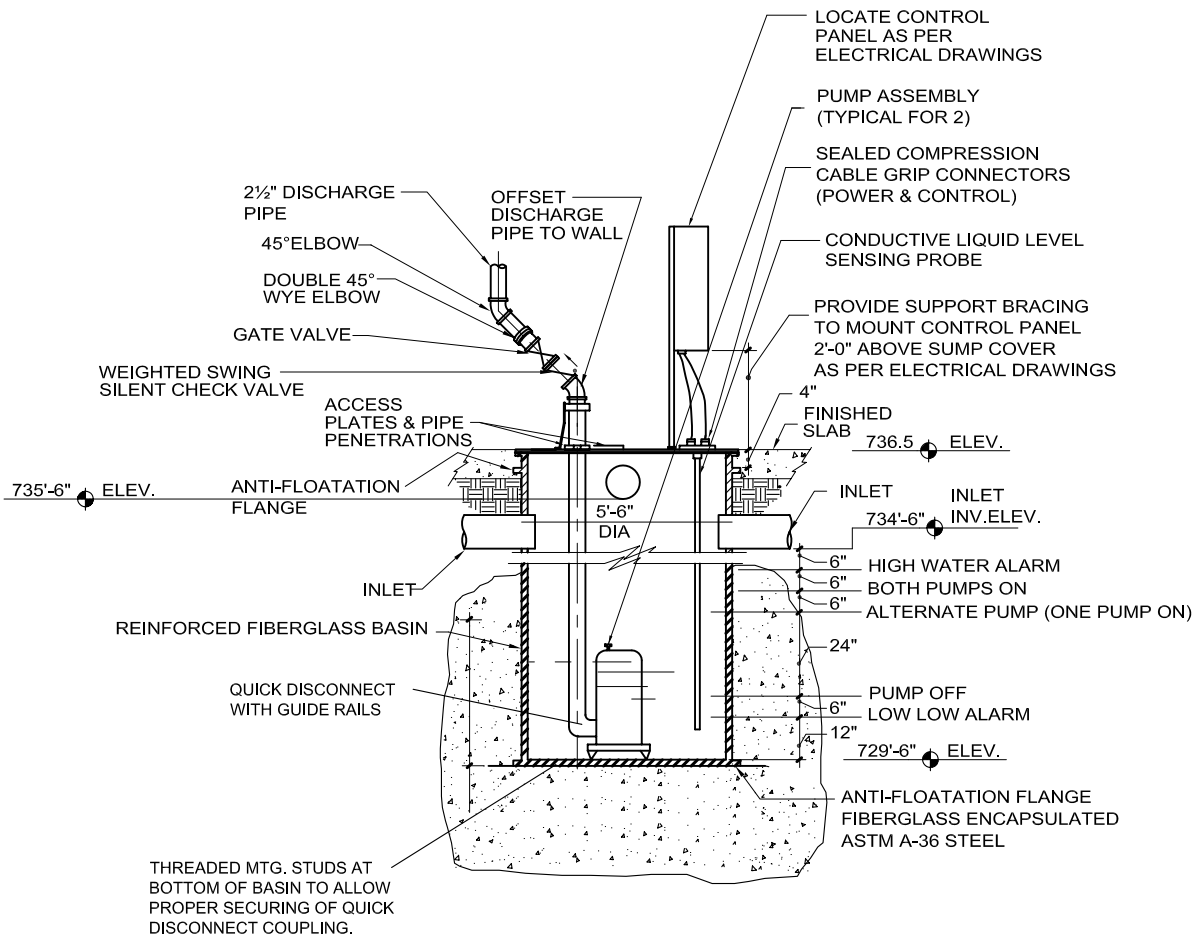
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09 SEP 2002



**PLAN AT EL. 736'-6"**

SCALE: 1/4"=1'-0"



NOTE:

SUBCONTRACTOR TO DESIGN AND INSTALL ALUMINUM COVER W/ FULL ACCESS TO THE PUMPS THE DESIGN SHALL BE REVIEWED AND APPROVED BY FERMILAB PRIOR TO INSTALLATION.

**DUPLEX SUMP PUMP BASIN DETAIL**

SCALE: N.T.S.

REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS

NAME	DATE
DESIGNED	
DRAWN	
CHECKED	
APPROVED	
SUBMITTED	

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY
<b>MuCOOL ENCLOSURE</b>
<b>MISC. MECHANICAL</b>
DRAWING NO. <b>4-1-35</b>
<b>M-7</b>
REV. <b>1</b>


## EXHAUST FAN SCHEDULE

MARK	UNITS QTY	LOCATION/SERVICE	CFM	E.S.P.	FAN RPM	DRIVE	SONES	ELECTRICAL			DAMPER	ROOF OPENING	ROOF CURB	MANUFACTURER	MODEL NO.	REMARKS
								HP	CURRENT	BHP						
EF-1 & EF-2	2	COMPRESSOR ROOM	7500	1/2"	697	BELT	14.9	3	480V/3/60	1.73	ALUMINUM GRAVITY BACKDRAFT DAMPER	31½" X 31½"	GALVANIZED REG-34 WITH DAMPER TRAY	LOREN COOK CO.	270 ACE-B CAT. NO. 270C10B	COMPLETE WITH NEMA 3R DISCONNECT SWITCH, 2 SPEED CONTROL, INTERLOCK W/ MOTORIZED LOUVER DAMPER W/ BACK DRAFT DAMPER, ROOF CURB, AND TWO-STAGE THERMOSTAT TO CONTROL 2-SPEED FAN
EF-3	1	REFRIGERATOR ROOM	2000	1/2"	1173	BELT	12.0	3/4	480V/3/60	.396	ALUMINUM GRAVITY BACKDRAFT DAMPER	19½" X 19½"	GALVANIZED REG-34 WITH DAMPER TRAY	LOREN COOK CO.	150 ACE-B CAT. NO. 150C6B	COMPLETE WITH NEMA 3R DISCONNECT SWITCH, 2 SPEED CONTROL, INTERLOCK W/ MOTORIZED LOUVER DAMPER W/ BACK DRAFT DAMPER, ROOF CURB, AND TWO-STAGE THERMOSTAT TO CONTROL 2-SPEED FAN
EF-4	1	HYDROGEN MANIFOLD ROOM	524	1/4"	1140	DIRECT	8.3	1/4	110V/1/60	.050	ALUMINUM GRAVITY BACKDRAFT DAMPER	12" X 12"	N/A	LOREN COOK CO.	ACW-D CAT. NO. 120W11D	COMPLETE WITH NEMA EXPLOSION PROOF SWITCH, EXPLOSION PROOF TYPE, CLASS I, DIVISION II

## SUMP PUMP SCHEDULE

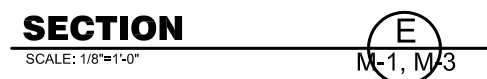
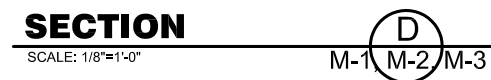
TAG NO.	LOCATION	PERFORMANCE DATA			SELECTION DATA			MOTOR DATA					REMARKS
		GPM	TOTAL FT. HD.	WATER TEMP.	DESIGN BASIS MANUFACTURER	TYPE	MODEL	RPM	HP	VOLTS	PHASE	CYCLE	
SP-1	EQUIPMENT ROOM	50	20	55° F	FLYGT	DUPLEX SUBMERSIBLE	CP-3045	3430	1.8	460	3	60	NEMA - DUPLEX CONTROL PANEL, MULTITROPE LEVEL CONTROL PROBE, QUICK DISCONNECT W/ GUIDE RAILS

NOTES:

1. PROVIDE GATE VALUE, CHECK VALUE & UNION IN RISER.
2. PROVIDE PHASE PROTECTION FOR MOTOR.
3. CONTROL PANEL WITH ALARM.
4. REF. TO SPEC 15440 - GROUNDWATER SUMP PUMP AND ACCESSORIES FOR EXPLOSION PROOF REQUIREMENTS

[illegible]

09 SEP 2002



**SCALE:**

8 0 8 16

1/8" = 1'-0"

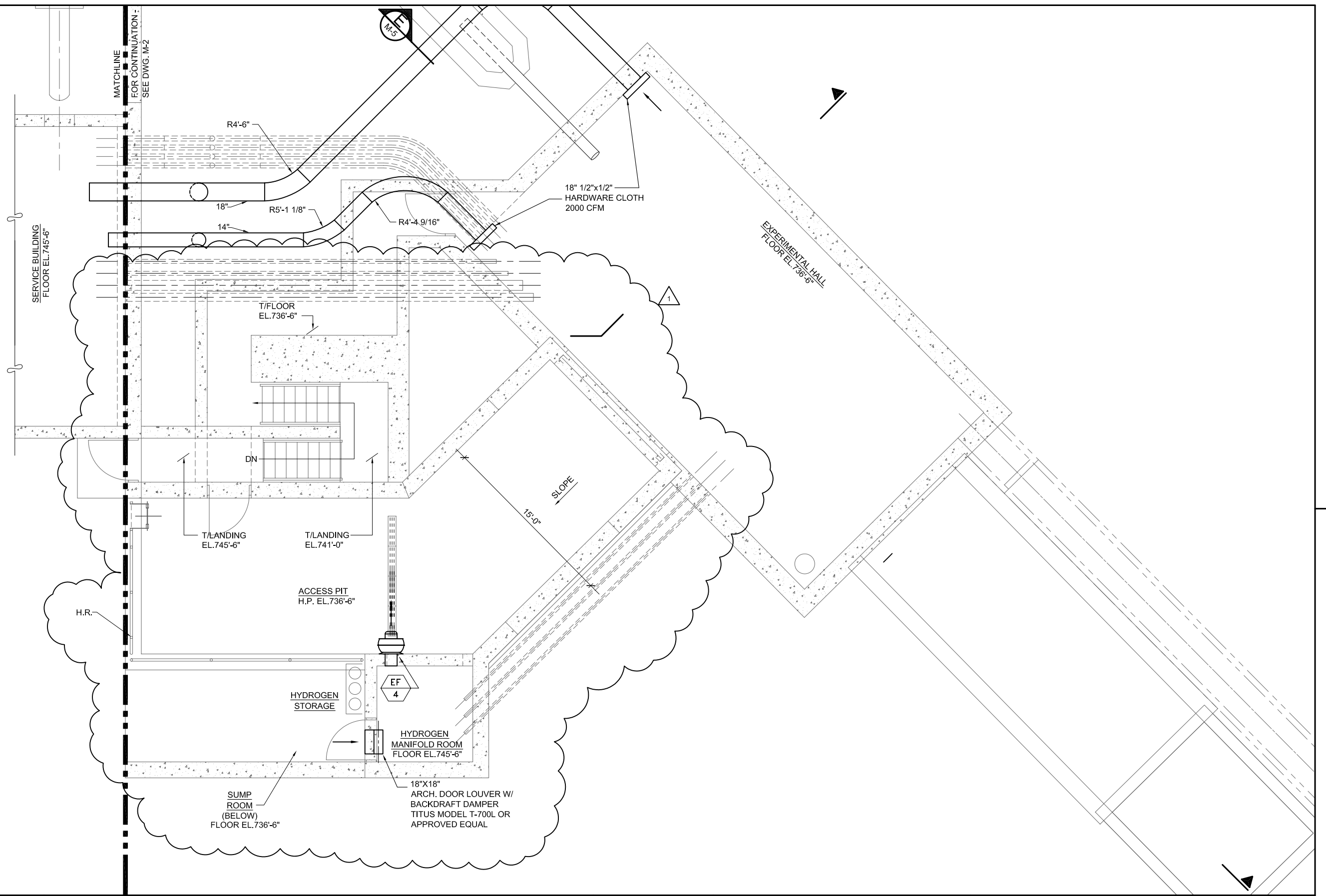
SCALE FEET

UNITED STATES DEPARTMENT OF ENERGY

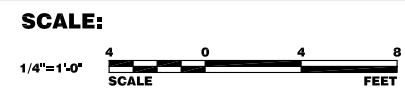



REV.



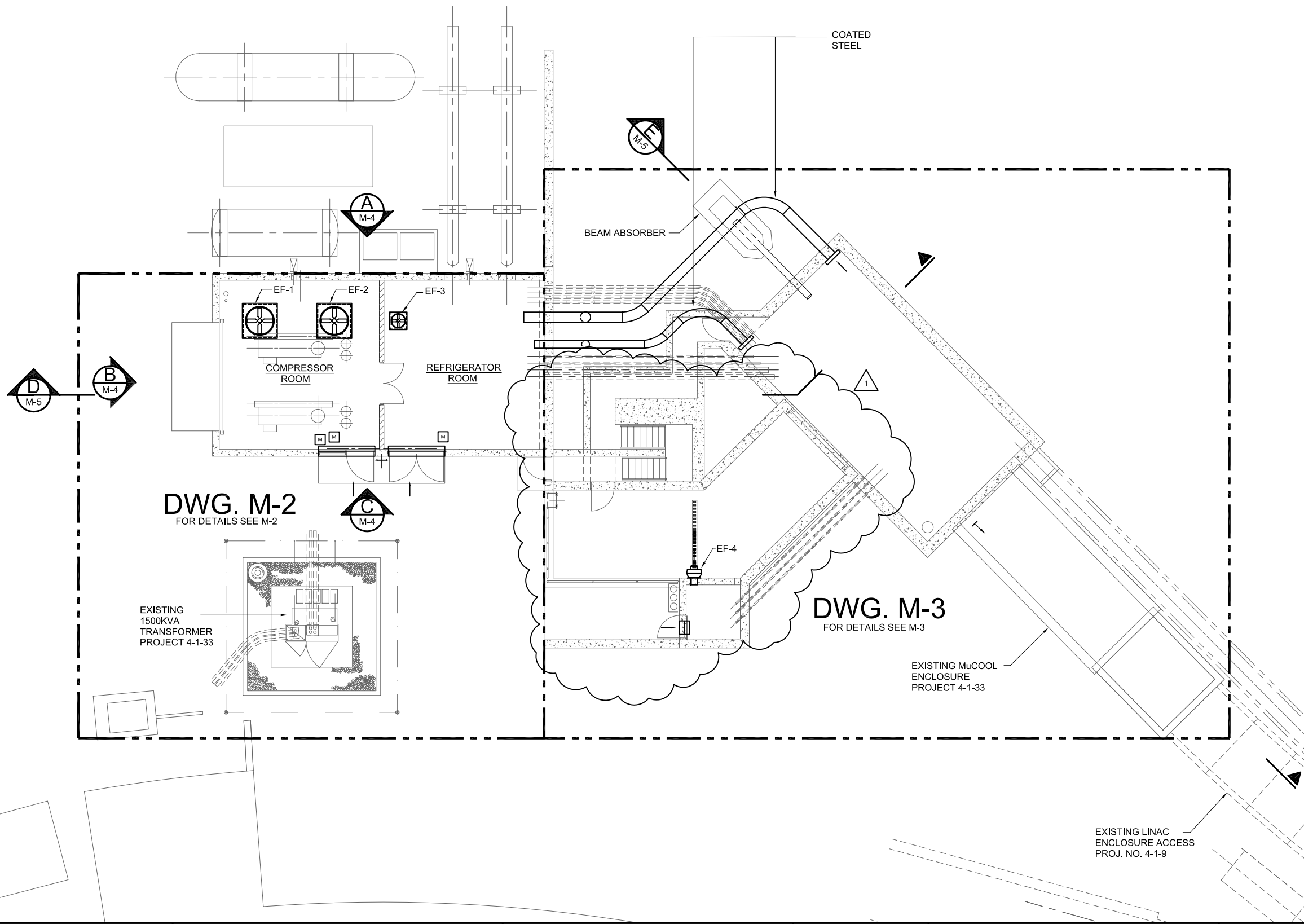


	NAME	DATE
DESIGNED		
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



<b>FERMI NATIONAL ACCELERATOR LABORATORY</b>			
UNITED STATES DEPARTMENT OF ENERGY			
	<b>MuCOOL ENCLOSURE</b> <b>ENLARGED PLAN - SHEET 2</b>		<b>31 JAN 2003</b>
DRAWING NO.	<b>4-1-35</b>	<b>M-3</b>	REV. 1

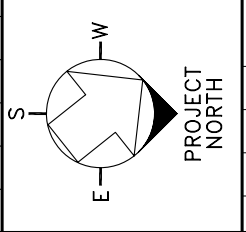




REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
		REVISIONS

NAME	DATE
DESIGNED	
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CHECKED	
APPROVED	
SUBMITTED	

NAME	DATE
DESIGNED	
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APPROVED	
SUBMITTED	



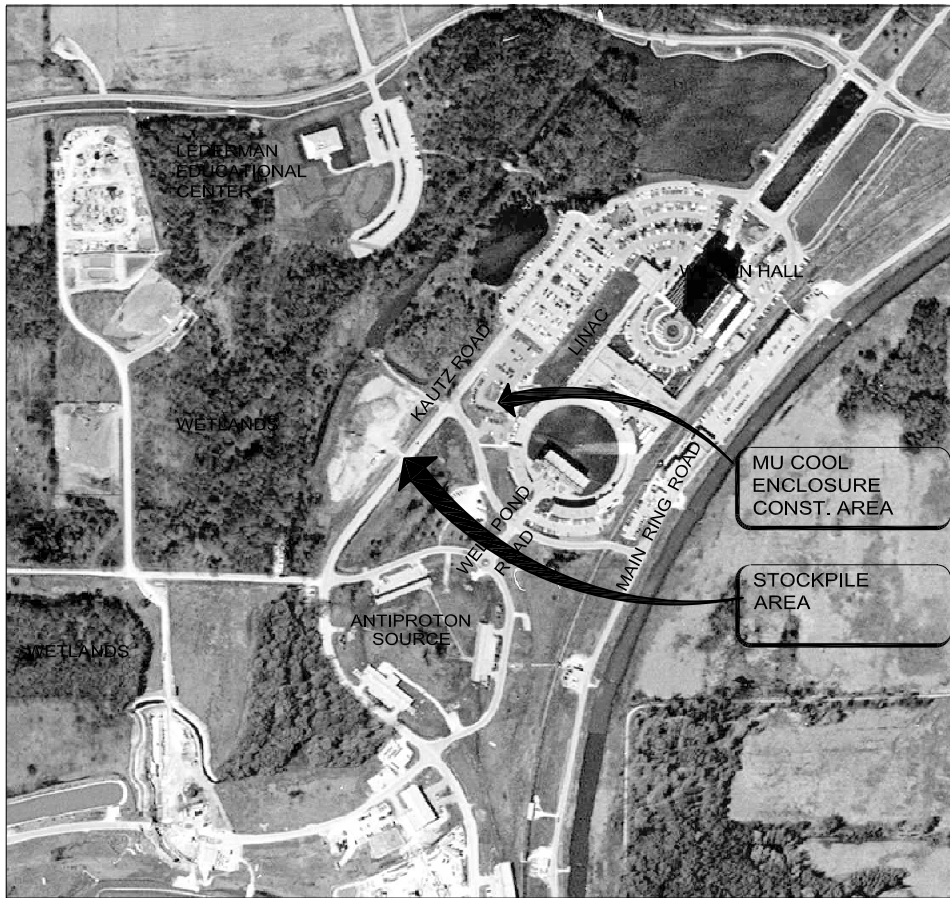
SCALE:	1/8"=1'-0"
SCALE	FEET

FERMI NATIONAL ACCELERATOR LABORATORY	
UNITED STATES DEPARTMENT OF ENERGY	
MuCOOL ENCLOSURE	
OVERALL MECHANICAL PLAN	
DRAWING NO. 4-1-35	M-1
REV.	

09 SEP 2002

# MuCOOL ENCLOSURE

## Project No. 4-1-35



**LOCATION PLAN**

N.T.S.

### DRAWING LIST

#### GENERAL DRAWINGS

**G-1 TITLE SHEET AND LOCATION PLAN** 1

#### DEMOLITION DRAWINGS

**D-1 EXISTING SITE PLAN W/ DEMOLITION** 2

#### EXCAVATION DRAWINGS

**EX-1 EXCAVATION LIMITS** 1

**EX-2 EXCAVATION SECTION** 1

#### CIVIL DRAWINGS

**C-1 SYMBOLS AND ABBREVIATIONS**

**C-2 GENERAL NOTES**

**C-3 PROPOSED SITE PLAN** 1

**C-4 PROPOSED GEOMETRICS & STRIPING** 2

**C-5 MISCELLANEOUS DETAILS** 1

**C-6 CROSS SECTION F**

**C-7 CROSS SECTION G**

**C-8 CROSS SECTION H**

**C-9 CROSS SECTION J & K**

#### STRUCTURAL DRAWINGS

**SC-1 GENERAL NOTES**

**SC-2 OVERALL STRUCTURAL PLAN** 1

**SC-3 ENLARGED PLAN - SHEET 1**

**SC-4 ENLARGED PLAN - SHEET 2** 1

**SC-5 ENLARGED PLAN - SHEET 3** 1

**SC-6 ENLARGED PLAN - SHEET 4**

**SC-7 ROOF PLAN**

**SC-8 SECTIONS & DETAILS - SHEET 1**

**SC-9 SECTIONS & DETAILS - SHEET 2** 1

**SC-10 SECTIONS & DETAILS - SHEET 3** 1

**SC-11 SECTIONS & DETAILS - SHEET 4** 1

**SC-12 SECTIONS & DETAILS - SHEET 5** 1

#### STRUCTURAL DRAWINGS (cont.)

**SC-13 SECTIONS & DETAILS - SHEET 6** 1

**SC-14 SECTIONS & DETAILS - SHEET 7** 2

**SC-15 SECTIONS & DETAILS - SHEET 8** 1

**SC-16 SECTIONS & DETAILS - SHEET 9** 1

**SC-17 SECTIONS & DETAILS - SHEET 10** 1

**SC-18 SECTIONS & DETAILS - SHEET 11** 1

**SC-19 SECTIONS & DETAILS - SHEET 12**

**SC-20 SECTIONS & DETAILS - SHEET 13**

**SC-21 SECTIONS & DETAILS - SHEET 14** 1

**SC-22 SECTIONS & DETAILS - SHEET 15** 2

**SS-1 STEEL HATCH COVER** 1

#### ARCHITECTURAL DRAWINGS

**A-1 ROOF PLAN** 1

**A-2 SERVICE BUILDING ELEVATIONS**

**A-3 CROSS SECTIONS** 1

**A-4 DOOR SCHEDULE AND DETAILS** 1

**A-5 SECTIONS AND DETAILS - SHEET 1**

**A-6 SECTIONS AND DETAILS - SHEET 2**

#### MECHANICAL DRAWINGS

**M-1 OVERALL MECHANICAL PLAN** 1

**M-2 ENLARGED PLAN - SHEET 1** 1

**M-3 ENLARGED PLAN - SHEET 2** 1

**M-4 ELEVATIONS**

**M-5 SECTIONS**

**M-6 SCHEDULE & NOTES**

**M-7 MISC. MECHANICAL** 1

### REVISION HISTORY

REVISION NUMBER	DATE OF ISSUE	REVISION DESCRIPTION
INITIAL ISSUE	09/09/02	ISSUED FOR BIDS
0	01/06/03	CONFORMED DRAWINGS PER AMENDMENTS 1 & 2
1	01/31/03	SHIELDING UPGRADE
2	01/31/03	VALUE ENGINEERING

### ELECTRICAL DRAWINGS

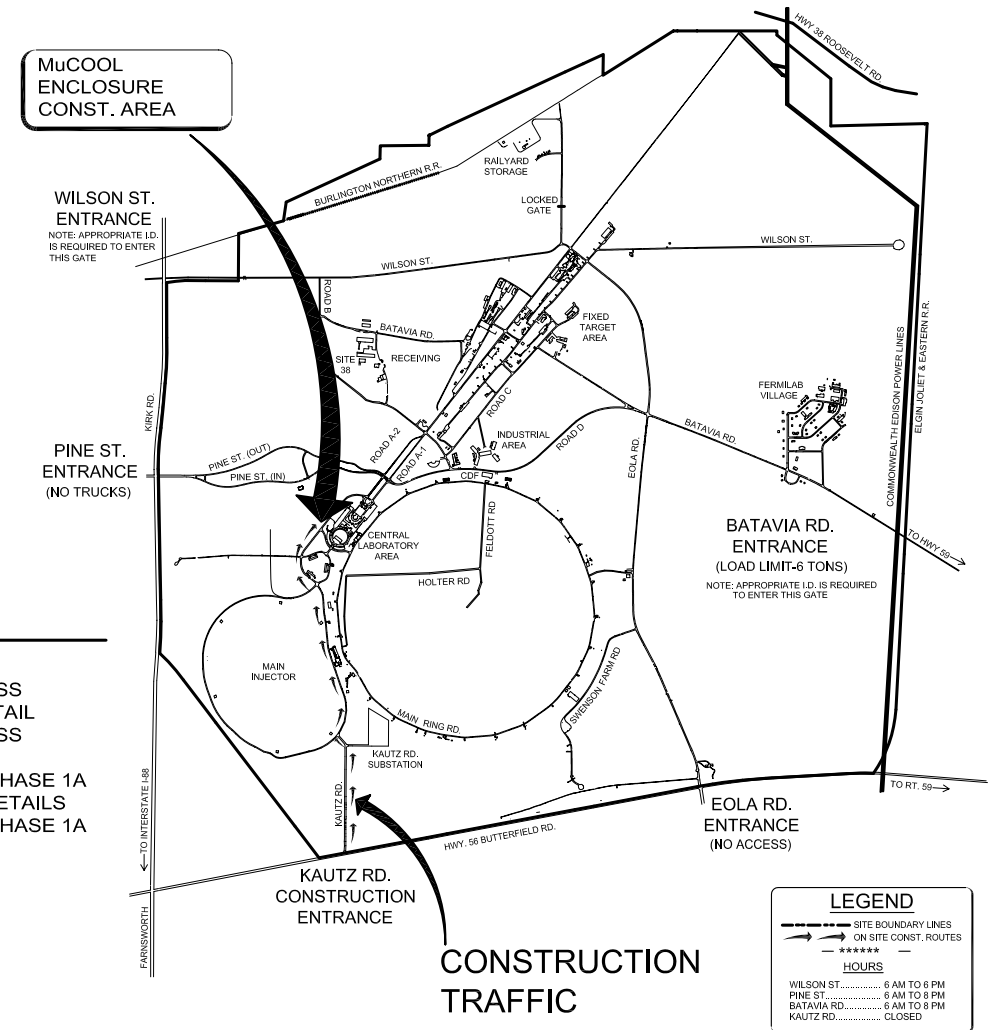
E-1	GENERAL NOTES & SYMBOLS - SHEET 1
E-2	GENERAL NOTES & SYMBOLS - SHEET 2
E-3	LIGHT FIXTURE SCHEDULE
E-4	MISC ELECTRICAL DETAILS 1 - SHEET 1
E-5	MISC ELECTRICAL DETAILS 2 - SHEET 2
E-6	POWER MONITOR DETAIL
E-7	SINGLE LINE DIAGRAM
E-8	PANEL BOARD SCHEDULE 1
E-9	PANEL BOARD SCHEDULE 2
E-10	POWER PLAN - I
E-11	POWER PLAN - II
E-12	LIGHTING PLAN - I
E-13	LIGHTING PLAN - II

### FIRE PROTECTION DRAWINGS

FP-1	SPRINKLER OVERALL PLAN
FP-2	SPRINKLER PLAN - SHEET 1
FP-3	SPRINKLER PLAN - SHEET 2
FP-4	SPRINKLER SECTIONS
FPE-1	OVERALL PLAN
FPE-2	FIRE ALARM PLAN - SHEET 1
FPE-3	FIRE ALARM PLAN - SHEET 2
FPE-4	FIRE ALARM DETAILS

### REFERENCE DRAWINGS

4-1-9	S-1	LINAC ENCLOSURE ACCESS PLAN, SECTIONS AND DETAIL
4-1-9	S-2	LINAC ENCLOSURE ACCESS SECTIONS AND DETAILS
4-1-33	S-1	MU COOL ENCLOSURE - PHASE 1A ENCLOSURE PLAN AND DETAILS
4-1-33	S-2	MU COOL ENCLOSURE - PHASE 1A SITE PLAN AND DETAILS

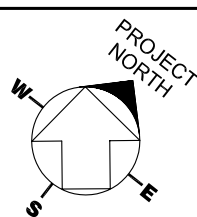


### VICINITY PLAN

NOT TO SCALE

REV.	DATE	DESCRIPTIONS
2	01/31/03	VALUE ENGINEERING
1	01/31/03	SHIELDING UPGRADE

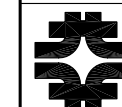
NAME	DATE
DESIGNED	R. Alber
DRAWN	R. Alber
CHECKED	J. Sims
APPROVED	D. Nevlin/E. Crumpley
SUBMITTED	S. Geer/M. Popovic



SCALE:

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**  
**TITLE SHEET AND LOCATION PLAN**

DRAWING NO. **4-1-35**

**G-1** REV. **2**

31 JAN 2003

1. SUBCONTRACTOR SHALL DESIGN AND INSTALL A COMPLETE LOW VOLTAGE FIRE ALARM SYSTEM IN ACCORDANCE WITH NFPA 72, NATIONAL FIRE ALARM CODE, 1999 EDITION, AND THE BID DESIGN DRAWINGS.
2. DETECTOR AND AUDIBLE CIRCUIT POLARITY SHALL BE OBSERVED.
3. AUDIBLE/VISUAL CIRCUIT WIRING SHALL BE SUPERVISED. NO PARALLEL BRANCHING IS PERMISSIBLE.
4. CONDUIT RUNS SHOWN ARE ONLY DIAGRAMMATIC. EXACT LOCATIONS ARE TO BE DETERMINED IN THE FIELD.
5. INSTALLATION SHALL BE IN STRICT CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE AND NFPA 72, NATIONAL FIRE ALARM CODE.
6. WIRING SHALL BE PER MANUFACTURER'S REQUIREMENTS AND NFPA. MATERIAL SHALL BE PURCHASED WITHIN 3 MONTHS OF AWARD OF SUBCONTRACT.
7. INSTALLING CONTRACTOR SHALL RETURN ONE SET OF ACCURATELY MARKED-UP DRAWINGS FOR "AS BUILT" PURPOSES.
8. FOR ADDITIONAL INSTALLATION INSTRUCTIONS, REFER TO CATALOG CUT SHEETS AND/OR INSTALLATION INSTRUCTIONS.
9. 120vac POWER SHALL NOT BE APPLIED TO FIRE ALARM PANEL WITHOUT DIRECT SUPERVISION OF TECHNICIAN.
10. ALL NEW HORN/STROBE AND STROBE DEVICES SHALL BE MOUNTED AT A HEIGHT OF 80" A.F.F. OR 6" BELOW DROPPED CEILING, WHICHEVER IS LOWER, TO THE BOTTOM OF THE DEVICE.
11. HORN UNITS SHALL BE RATED AT 87 dba @ 10 FEET.
12. ALL WIRE SHALL BE IN RIGID (IMC) CONDUIT. MIN. 3/4" TRADE SIZE UNLESS NOTED. ALL FITTINGS SHALL BE THREADED WITH IMC CONDUIT.
13. WIRING SHALL BE CONTINUOUS FROM DEVICE TERMINAL TO DEVICE TERMINAL. SPLICES, WIRENUTS, & TERMINAL BLOCKS IN THE FIELD ARE NOT ACCEPTABLE.
14. END OF LINE VALUES ARE AS FOLLOWS: (VERIFY WITH MANUFACTURER)  
DETECTION - 3.9K, 1/2W RESISTOR  
AUDIO/VISUAL CIRCUITS - 10K, 1/2W RESISTOR
15. ALL NEW MANUAL PULL STATIONS SHALL BE MOUNTED AT A HEIGHT OF 48 INCHES A.F.F. TO THE CENTER OF DEVICE.
16. BATTERY SHALL BE SIZED IN ACCORDANCE WITH NFPA 72, NATIONAL FIRE ALARM CODE, 1999 EDITION.
17. INSTALLATION CONTRACTOR SHALL COORDINATE WITH FERMLAB FOR LOCATION OF INTERFACE WITH FIRUS.
18. OPERATION OF ALL FIRE ALARM STROBE DEVICES SHALL BE SYNCHRONIZED.
19. THE MINIMUM EFFECTIVE INTENSITY FOR ALL FIRE ALARM HORN/STROBE DEVICES SHALL BE 30cd.

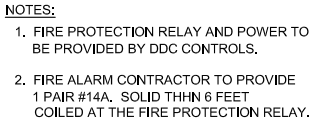
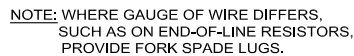


Diagram illustrating the wiring connection for a Manual Pull Station:

- Wires from the **FIRE ALARM CONTROL PANEL OR PRECEDING DEVICE** (labeled with **-** and **+**) connect to terminals **1** and **2** of the Manual Pull Station.
- Terminal **3** is connected to the **TO NEXT DEVICE OR** line.
- Terminal **4** is connected to **IF SHIELDED CABLE IS USED, PROVIDE EARTH GROUND**.

WIRING SCHEDULE		
SYMBOL	TYPE USED	DEVICE
A	1 PAIR #14 AWG THHN SOLID	DETECTION
B	1 PAIR #12 AWG THHN SOLID	AUDIO/ VISUAL
C	1 PAIR #22AWG SHIELDED SOLID	FIRUS INTERFACE
D	#12AWG STRANDED	POWER SUPPLY
G	#12AWG GROUND STRANDED	EARTH GROUND

**FIRE ALARM CIRCUITS SHALL BE 600 VAC, THHN/THWN**



## **WATERFLOW WIRING DIAGRAM**



SCALE: NONE

- ① INSTALL DUCT SMOKE DETECTOR DOWNSTREAM OF THE FAN AND UNIT AS SHOWN.
- ② PROVIDE COMPLETE WIRING AND INSTALLATION OF THE SMOKE DETECTION SYSTEM.
- ③ THE SEQUENCE OF OPERATION IS AS FOLLOWS: WHEN SMOKE IS DETECTED BY THIS SMOKE DETECTOR, THE MAKE-UP AIR UNIT SHALL BE SHUT DOWN. THE UNIT SHALL NOT BE CAPABLE OF RESTARTING UNTIL THE SMOKE DETECTOR IS MANUALLY RESET.
- ④ THE SMOKE DETECTOR SYSTEM SHALL BE "SYSTEM SENSOR" MODEL DH-400-ACDCP PHOTO ELECT. DETECTOR FOR 24 VDCR. THE REQUIRED ACCESSORIES FOR A COMPLETE SYSTEM SHALL BE COMPATIBLE WITH THE SIEMENS FIRE ALARM CONTROL PANEL (FACP).
- ⑤ ALL EQUIPMENT IN THE SMOKE DETECTION SYSTEM SHALL BE LISTED FOR INTENDED PURPOSE BY A RECOGNIZED TESTING LABORATORY SATISFACTORY TO THE FERMLAB FIRE PROTECTION ENGINEERING GROUP.
- ⑥ PROVIDE SMOKE TEST OF THE SYSTEM TO SHOW THAT THE SYSTEM IS OPERATIONAL.
- ⑦ ALL JUNCTION BOXES, CONCEALED OR EXPOSED, SHALL HAVE COVERED PLATES PAINTED RED OR HAVE A PERMANENT LABEL READING FIRE ALARM CIRCUIT.
- ⑧ SUBCONTRACTOR SHALL COORDINATE ANY FIRE SYSTEM DEACTIVATION TO ENSURE FERMLAB HAS MADE PROVISIONS TO SAFEGUARD THE AFFECTED BUILDING.
- ⑨ NOTIFY FERMLAB FIRE PROTECTION GROUP, THRU THE FERMLAB CONSTRUCTION COORDINATOR PRIOR TO THE FINAL TIE-IN AND CONNECTION TO THE FIRE ALARM CONTROL PANEL (FACP)

**FACP** FIRE ALARM CONTROL PANEL MANUFACTURED BY  
SIEMENS – CERBERUS MODEL SXL

**F** MANUAL PULL STATION, DUAL ACTION

 COMBINATION HORN AND STROBE, 87 DBA  
STROBE 30cd

**AI** ADDRESSABLE (DUAL) MODULE

**AI<sub>R</sub>** ADDRESSABLE RELAY MODULE

**D** DUCT SMOKE DETECTOR

REV.	DATE	DESCRIPTIONS
		REVISIONS

NAME		DATE
DESIGNED	<b>J. NIEHOFF</b>	
DRAWN	<b>K. EATON</b>	
CHECKED		
APPROVED		
SUBMITTED		

1/8" = 1'-0"

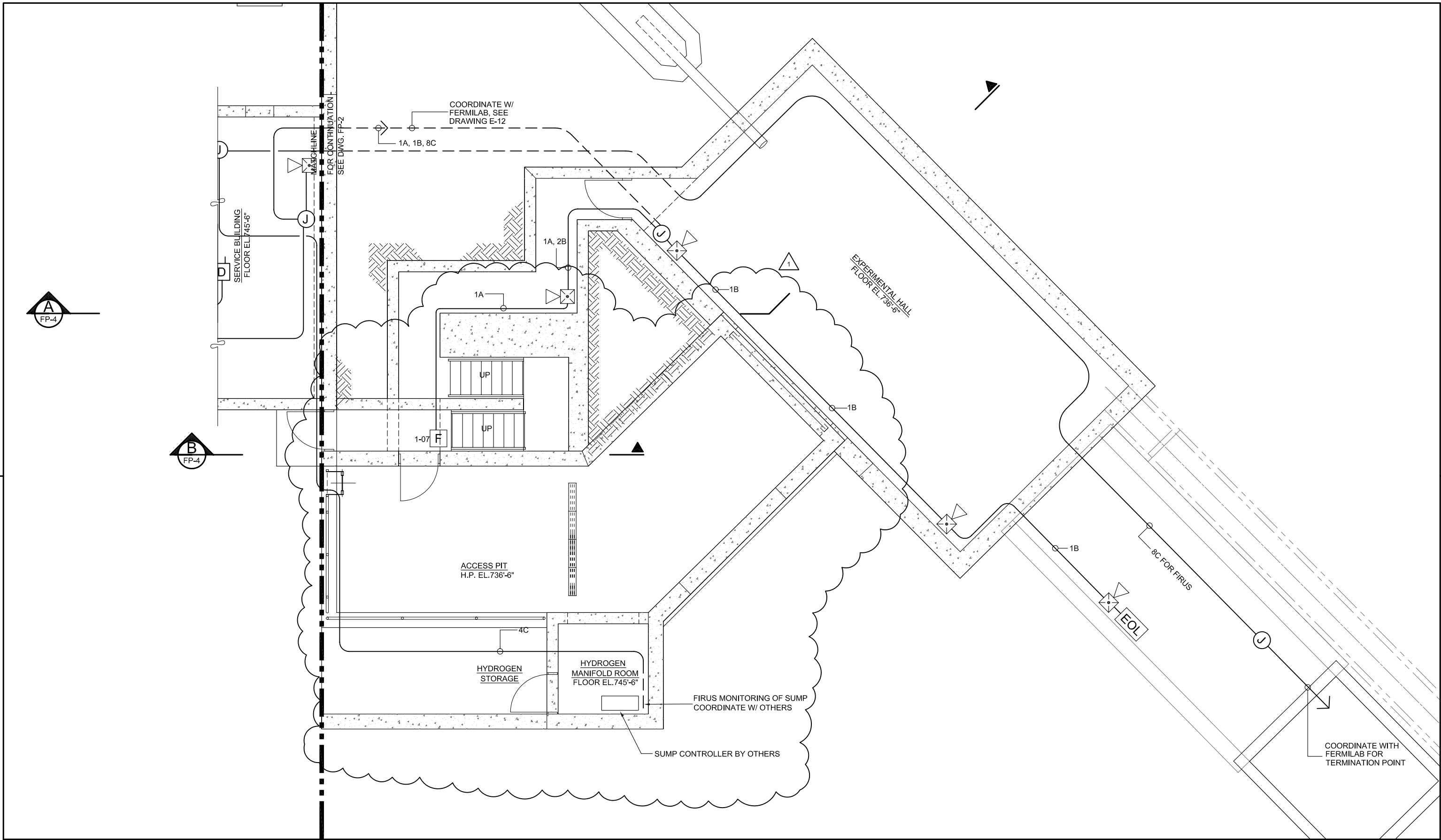
A horizontal graphic scale bar. It is divided into four equal segments. The first segment is black, the second is white, the third is black, and the fourth is white. Above the bar, the numbers 8, 0, 8, and 16 are placed at the boundaries of the segments. Below the bar, the word "SCALE" is centered under the first two segments, and the word "FEET" is centered under the last two segments.

UNITED STATES DEPARTMENT OF ENERGY

**FPE-4**

REV.

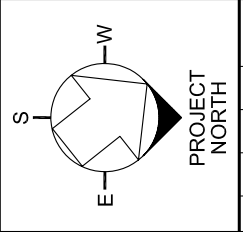
09 SEP 2002



REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

NAME	DATE
DESIGNED	J. NIEHOFF
DRAWN	K. EATON
CHECKED	
APPROVED	
SUBMITTED	

DESIGNED	J. NIEHOFF	
DRAWN	K. EATON	
CHECKED		
APPROVED		
SUBMITTED		



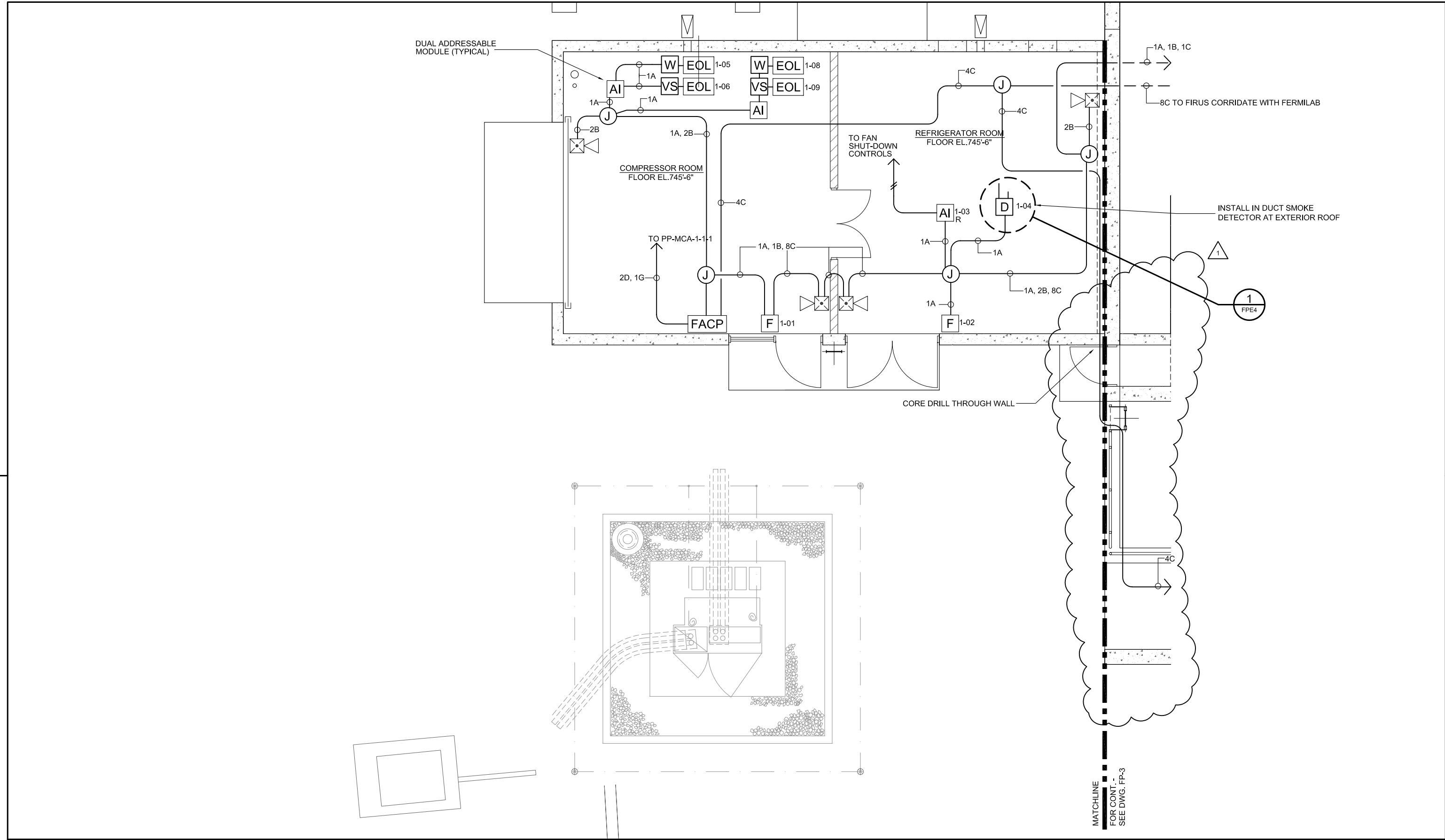
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1/4"=1'-0"

4 0 4 8  
SCALE FEET

**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

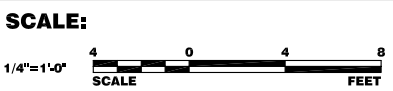
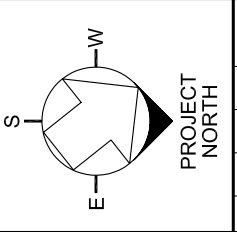
**MuCOOL ENCLOSURE**  
**FIRE ALARM PLAN - SHEET 2**

DRAWING NO. **4-1-35** **FPE-3** REV. 1



REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

	NAME	DATE
DESIGNED	J. NIEHOFF	
DRAWN	K. EATON	
CHECKED		
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

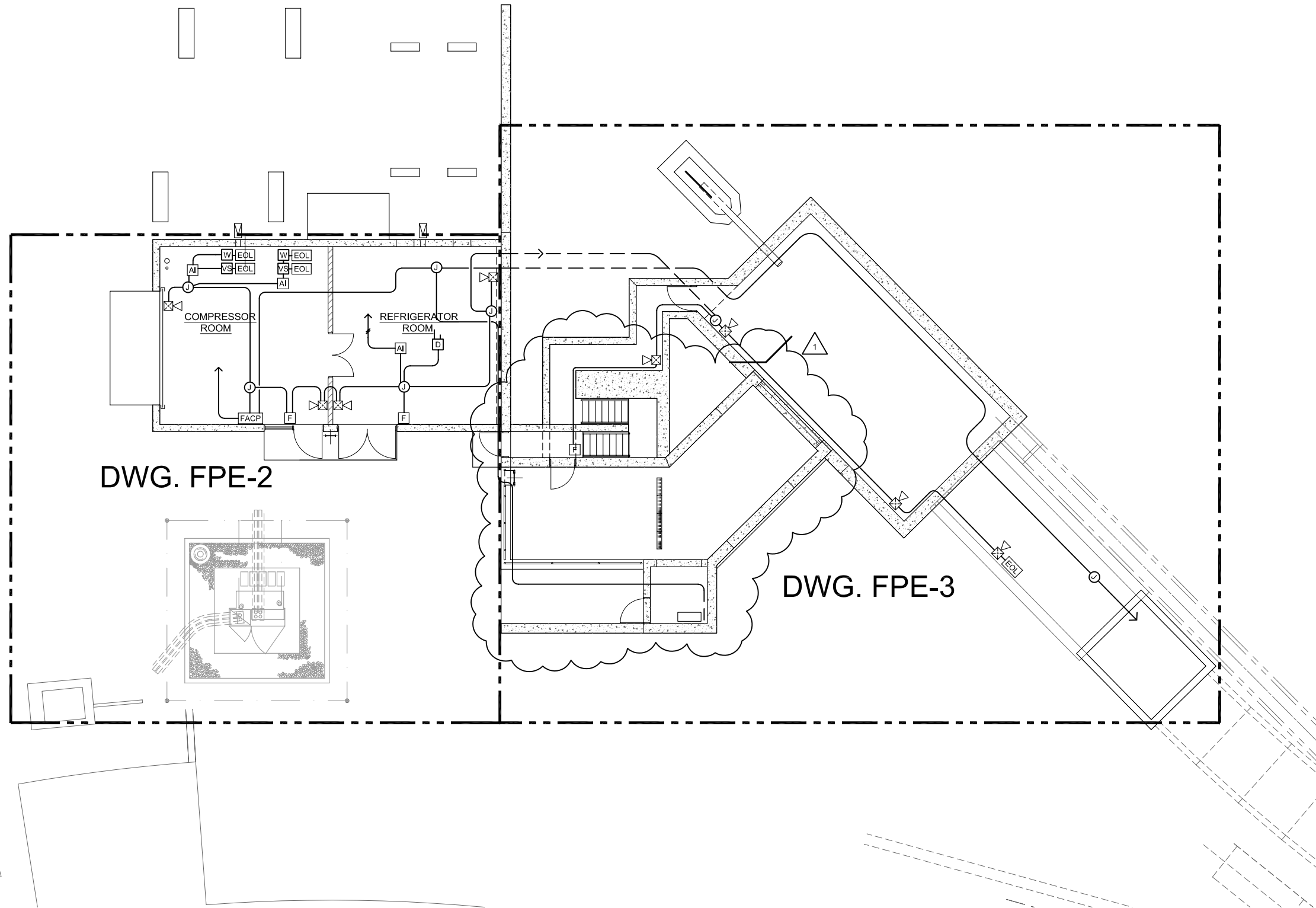
**MuCOOL ENCLOSURE**

**FIRE ALARM PLAN - SHEET 1**

DRAWING NO. **4-1-35**

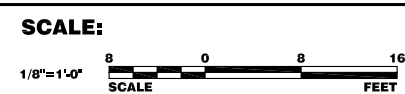
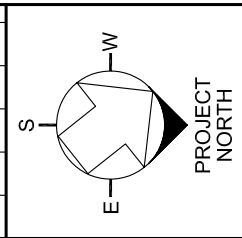
**FPE-2**

REV. 1




REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

	NAME	DATE
DESIGNED	J. NIEHOFF	
DRAWN	K. EATON	
CHECKED		
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**  
**OVERALL PLAN**

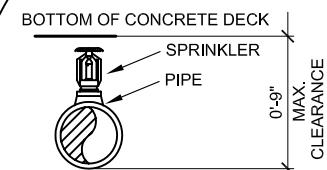
DRAWING NO. **4-1-35****FPE-1** REV. **1**

T/PARAPET  
EL.758'-2 1/2"

T/FLOOR  
EL.745'-6"

T/FLOOR  
EL.736'-6"

10 TON CRANE



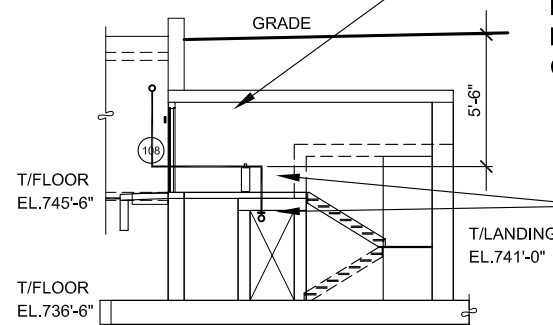
PROVIDE 6"x4" CONCENTRIC REDUCERS

## SECTION

SCALE: 1/8"=1'-0"

A  
FP-3

4" BURIED PIPE SHALL BE SEAMLESS SCHEDULE 40 PIPE WITH WELDED FITTINGS AND TWO WELDED FLANGES, ONE AT EACH END. PROVIDE EXTERIOR BITUMINOUS COATING.



PROVIDE FRICTION CLAMP AND CONCRETE PIPE STAND WITH RESTRAINING CLAMP AROUND PIPE.

## SECTION

SCALE: 1/8"=1'-0"

B  
FP-3

GRADE

SPLASH BLOCK

HDPE ANCHOR  
RESTRAINT SEE DETAIL  
ON SHEET C-12

MECHANICAL JOINT  
STYLE ADAPTER

MECHANICAL JOINT  
RESISTANT (MEGA  
LUG) FLANGES AND  
SILO SLEEVE  
ASSEMBLY

## RISER DETAIL

NTS

A  
FP-2

### KEY

- 6" ICW LEAD-IN
- 6" PIPE HEADER
- OS&Y GATE VALVE WITH VALVE SUPERVISORY SWITCH
- CHECK VALVE WITH INLET AND OUTLET GUAGES (VIKING)
- WATERFLOW DETECTOR (VANE TYPE) (SYSTEM SENSOR)
- INSPECTOR'S TEST CONNECTION, PIPE TO 2" DRAIN (SURTEST)
- 4" CHECK VALVE (VIKING)
- 4" F.D.C. STORZ QUICK CONNECT (REMOVE GASKET) WITH 22 1/4° ELBOW, GALVANIZED STEEL APPROX. 18" A.F.F.
- 2" MAIN DRAIN DISCHARGE - GALVANIZED PIPE AND FITTINGS
- PIPE STANDS, AS REQUIRED
- 2" MAIN DRAIN VALVE
- 6" SPRINKLER RISER FOR COMPRESSOR AND REFRIGERATION ROOMS
- 6" FIRE PROTECTION RISER FOR EXPERIMENTAL HALL

SCALE:

1/8"=1'-0"  
SCALE  
8 0 8 16  
FEET

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



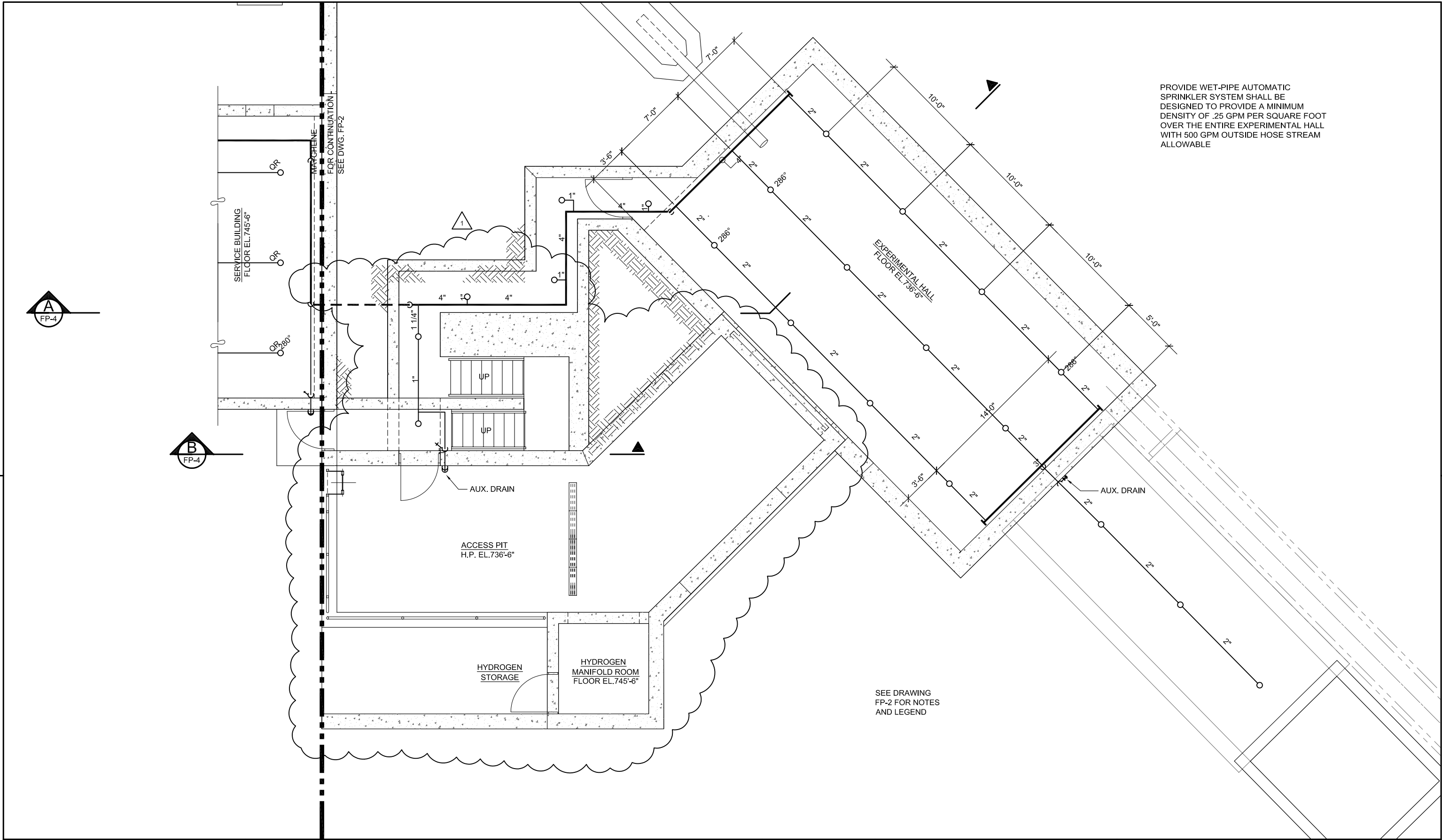
**MuCOOL ENCLOSURE**  
**SPRINKLER SECTIONS**

DRAWING NO. **4-1-35**

**FP-4**

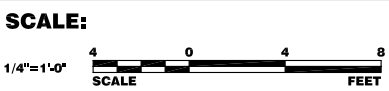
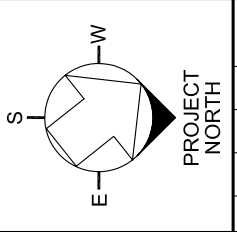
REV.

09 SEP 2002



REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

	NAME	DATE
DESIGNED	J. NIEHOFF	
DRAWN	J. NIEHOFF	
CHECKED	L. HAMMOND	
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**




**SPRINKLER PLAN - SHEET 2**

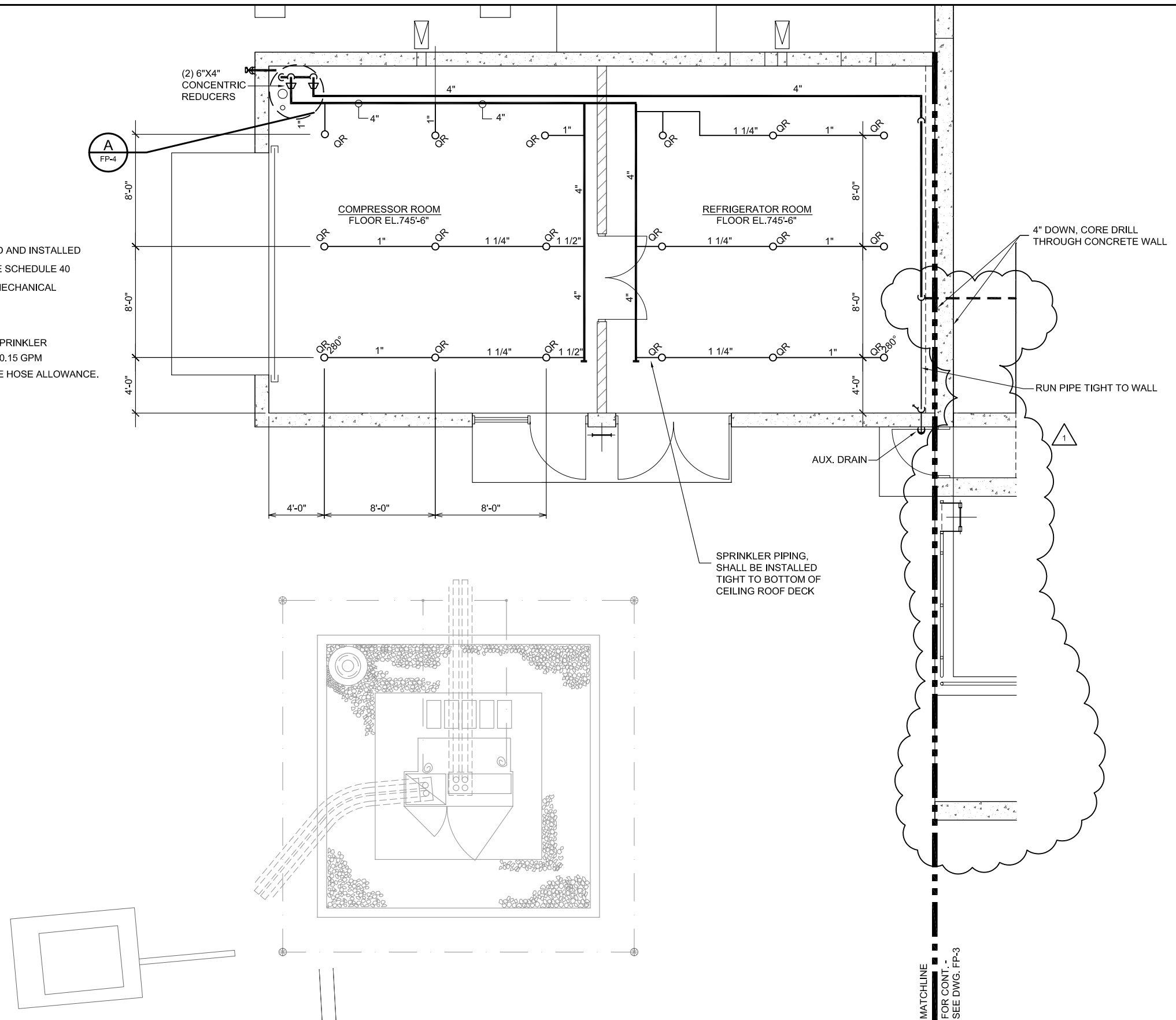
DRAWING NO. **4-1-35** **FP-3** REV. 1

## NOTES

1. THE WET-PIPE AUTOMATIC SPRINKLER SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NFPA 13, 1999 EDITION. ALL PIPING SHALL BE SCHEDULE 40 CARBON STEEL PIPING WITH CAST IRON THREADED OR GROOVED MECHANICAL (COUPLING) FITTINGS
2. HANGERS SHALL BE IN ACCORDANCE WITH NFPA 13.
3. THE COMPRESSOR ROOM WET (PROVIDE WET TYPE) AUTOMATIC SPRINKLER SYSTEM SHALL BE DESIGNED TO PROVIDE A MINIMUM DENSITY OF 0.15 GPM PER SQUARE FOOT OVER THE ENTIRE AREA WITH 250 GPM OUTSIDE HOSE ALLOWANCE.

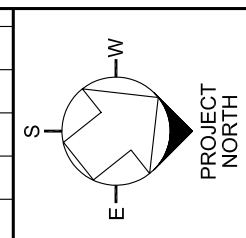
## LEGEND

-  SPRINKLER PIPING, BLACK STEEL, SCHEDULE 40  
WITH THREADED OR GROOVED END FITTINGS
-  QQR QUICK RESPONSE, UPRIGHT SPRINKLER, 200° F,  
UNLESS INDICATED OTHERWISE, BRASS FINISH, 1/2" ORIFICE  
MANUFACTURED BY VIKING
-  O STANDARD RESPONSE, UPRIGHT SPRINKLER, 200° F,  
UNLESS INDICATED OTHERWISE, BRASS FINISH, 3/4" ORIFICE  
MANUFACTURED BY VIKING

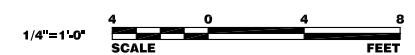


1	01/31/03	REVISED ENCLOSURE WALLS
REV.	DATE	DESCRIPTIONS
		REVISIONS

NAME		DATE
DESIGNED	<b>J. NIEHOFF</b>	
DRAWN	<b>J. NIEHOFF</b>	
CHECKED	<b>L. HAMMOND</b>	
APPROVED		
SUBMITTED		



**SCALE:**

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

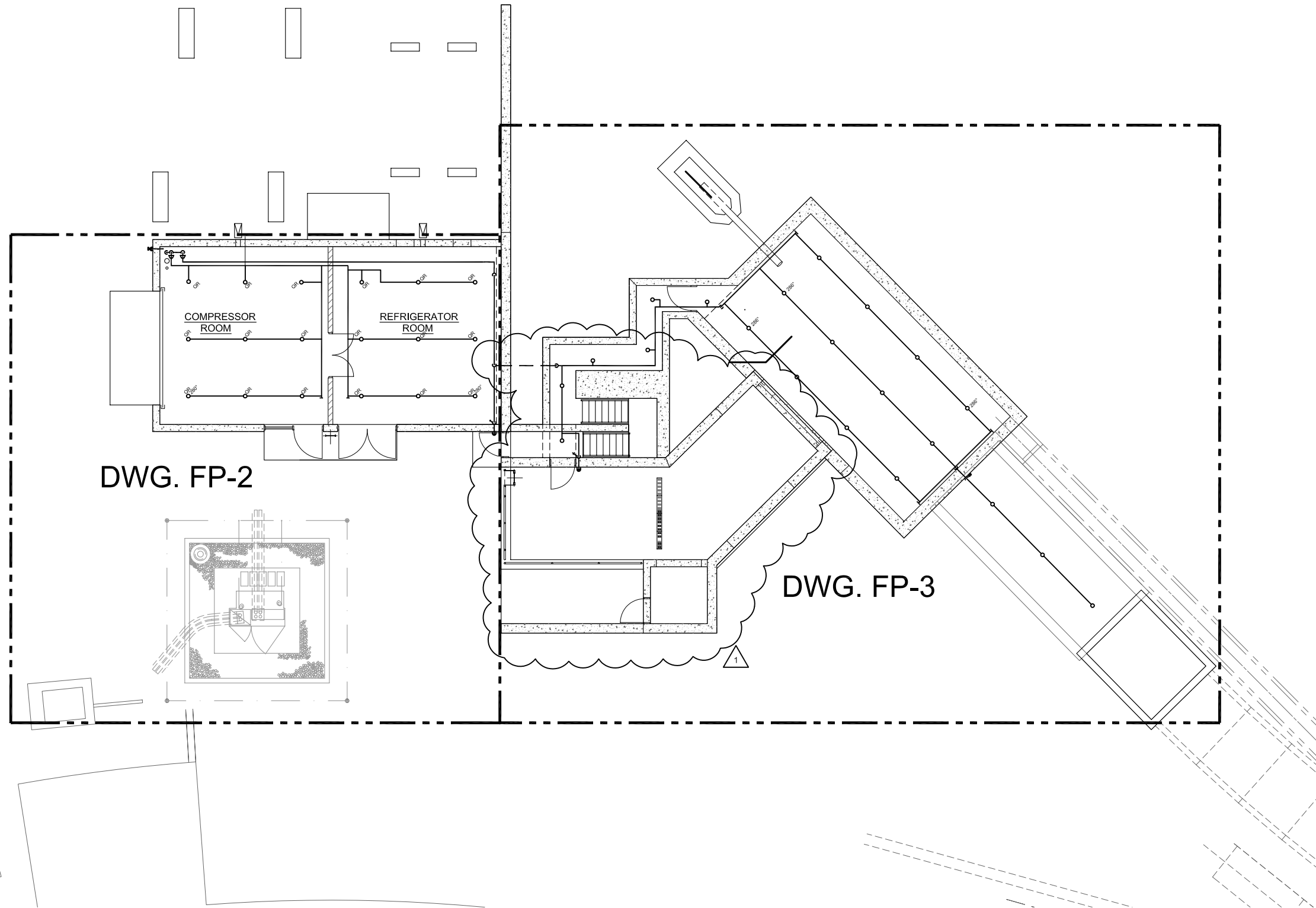


## MuCOOL ENCLOSURE

# SPRINKLER PLAN - SHEET 1

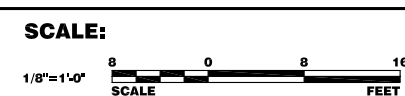
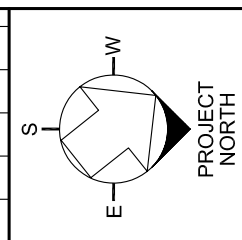
DRAWING NO.	<b>4-1-35</b>	<b>FP-2</b>	REV.	<b>1</b>
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31 JAN 2003




REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

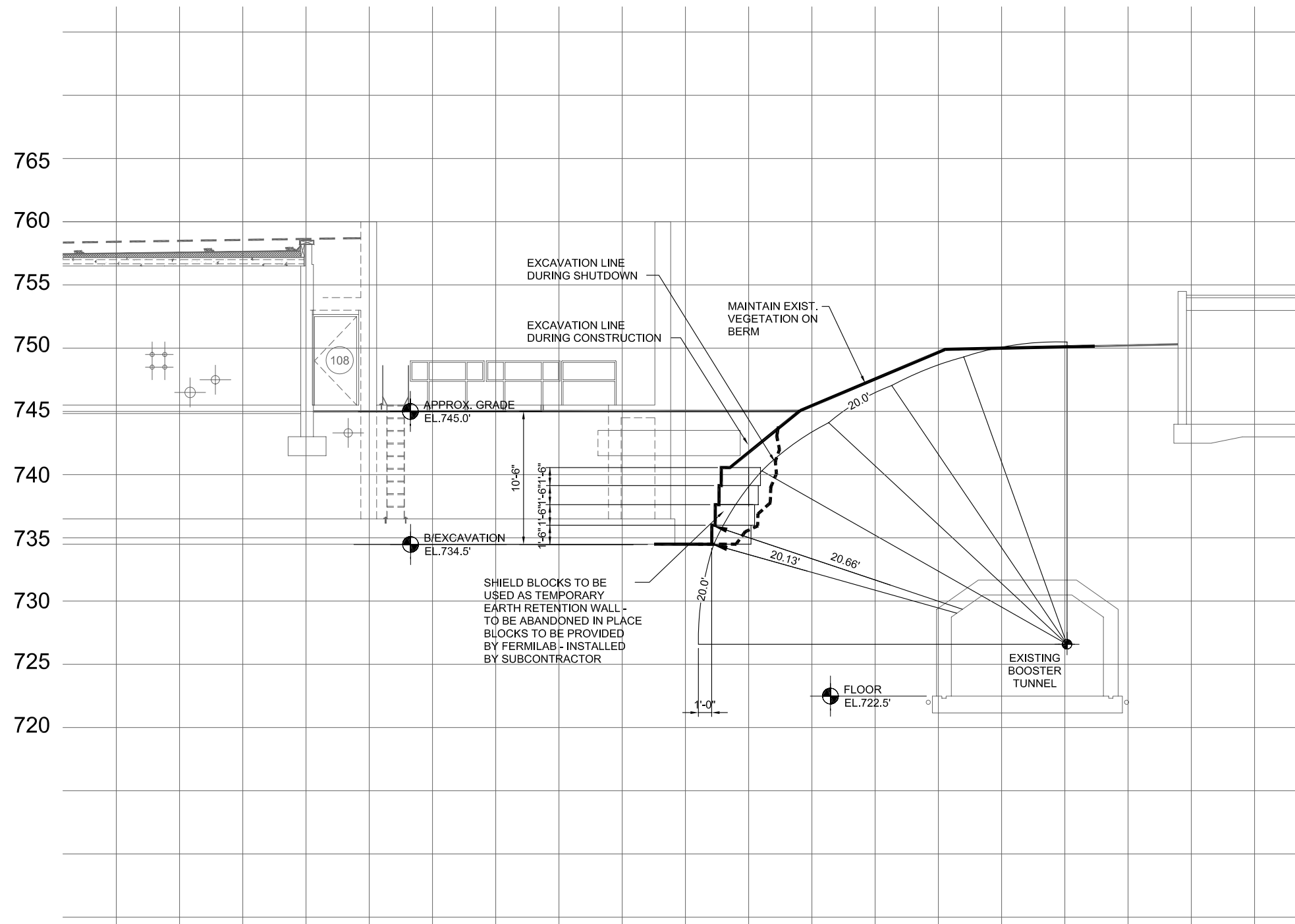
	NAME	DATE
DESIGNED	J. NIEHOFF	
DRAWN	J. NIEHOFF	
CHECKED	L. HAMMOND	
APPROVED		
SUBMITTED		



**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**  
**SPRINKLER OVERALL PLAN**

DRAWING NO. **4-1-35** **FP-1** REV. **1**



**SECTION**  
SCALE: 1"=5'-0"

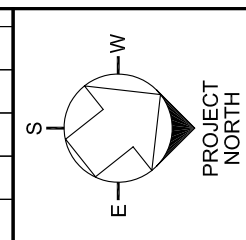
A  
EX-1

**AS-BUILT**  
21 JAN 2003

PLOT-DATE

REV.	DATE	DESCRIPTIONS
1	01/21/03	AS-BUILT
REVISIONS		

NAME	DATE
DESIGNED	
DRAWN	R. ALBER
CHECKED	
APPROVED	
SUBMITTED	



SCALE:

1" = 5'-0"



**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY



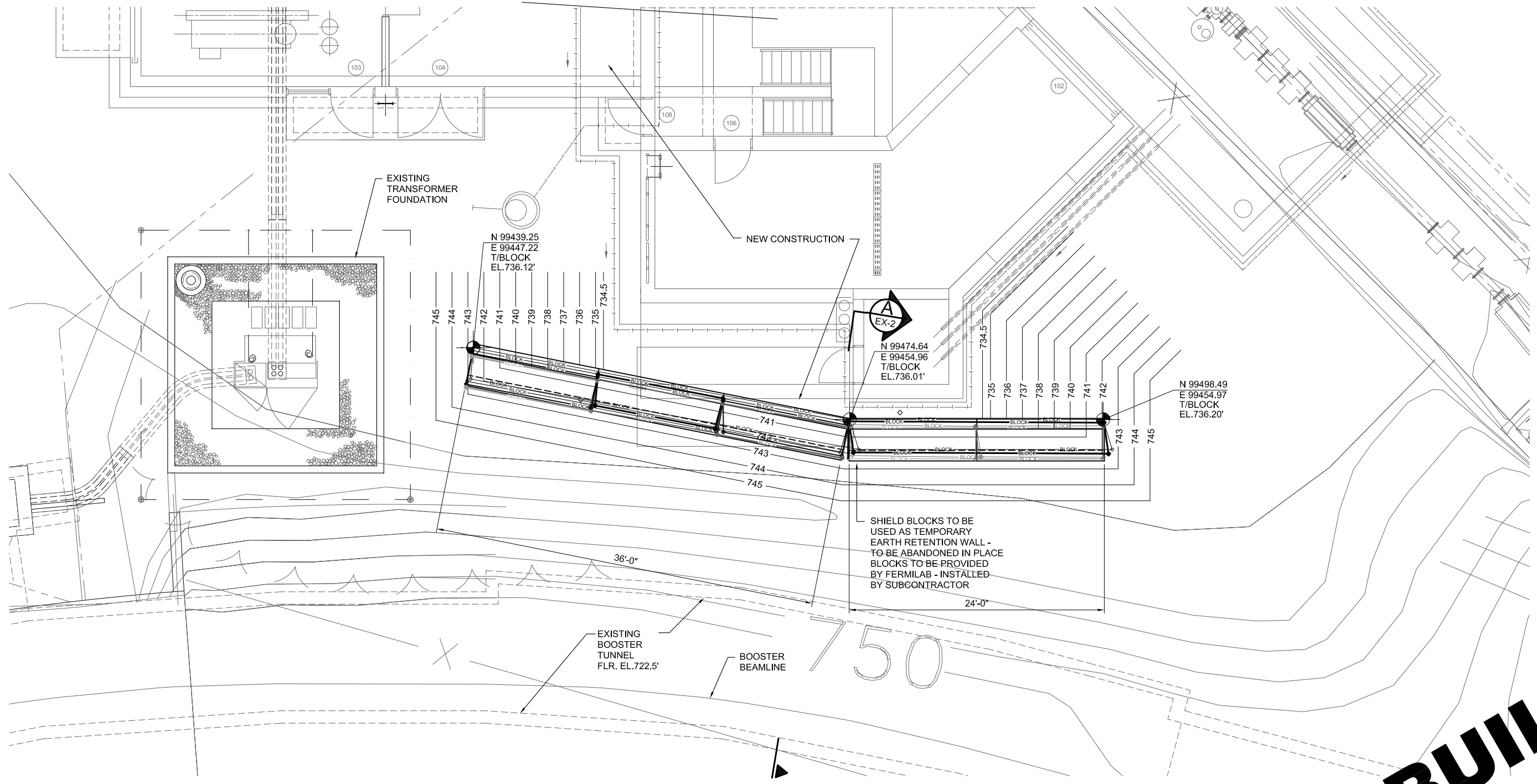
**MuCOOL ENCLOSURE**  
**EXCAVATION SECTION**

DRAWING NO. **4-1-35**

**EX-2**

REV. 1

31 JAN 2003



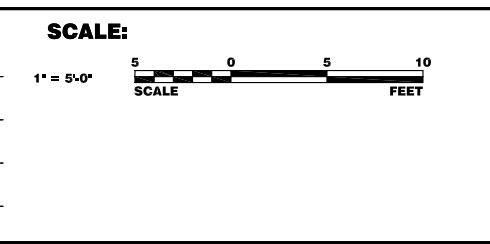
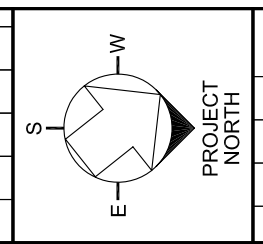
**EXCAVATION LIMITS** (FOR 20 FEET EARTH EQUIVALENT SHIELDING FROM BOOSTER TUNNEL)  
SCALE: 1"= 5'

**AS-BUILT**  
21 JAN 2003

PLOT-DATE

REV.	DATE	DESCRIPTIONS
1	01/21/03	AS-BUILT
REVISIONS		

DESIGNED	NAME	DATE
DRAWN	R. ALBER	
CHECKED		
APPROVED		
SUBMITTED		

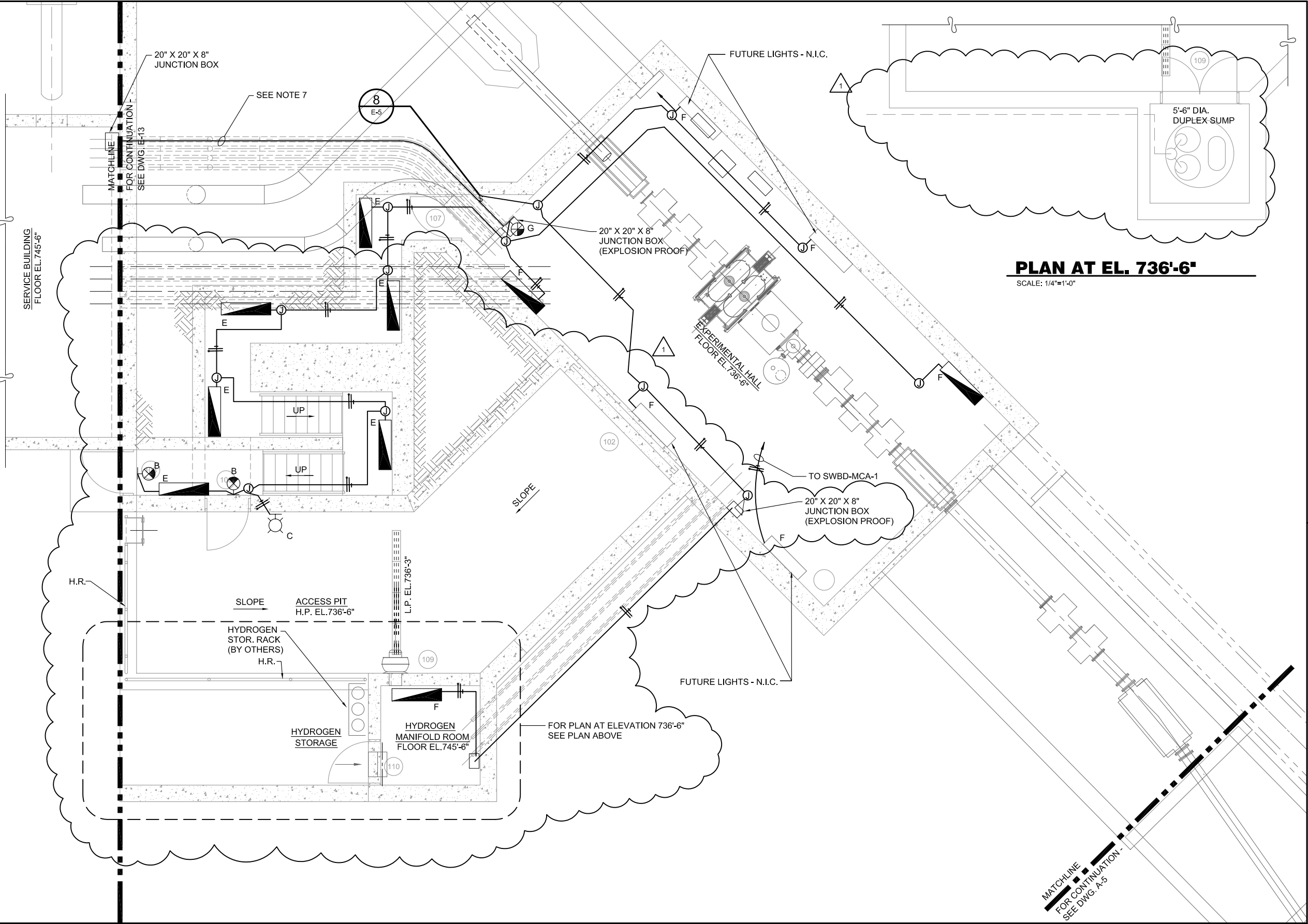


<b>FERMI NATIONAL ACCELERATOR LABORATORY</b> UNITED STATES DEPARTMENT OF ENERGY		
	<b>MuCOOL ENCLOSURE</b> <b>EXCAVATION LIMITS</b>	
DRAWING NO. <b>4-1-35</b>	<b>EX-1</b>	REV. 1

31 JAN 2003

NOTES:

1. SEE DWG. E-1 & E-2 FOR SYMBOLS, AND GENERAL NOTES.
2. SEE DWG. E-2 FOR FIXTURE SCHEDULE.
3. ALL CONDUIT SHALL BE 3/4", UNLESS NOTED OTHERWISE.
4. ALL WIRE SHALL BE 1/C #12, UNLESS NOTED OTHERWISE.
5. SUBCONTRACTOR TO INSTALL EXIT SIGNS & OUTDOOR LIGHTING FIXTURE AS CLOSE TO DOOR AS POSSIBLE WITHOUT INTERFERENCE WITH MECHANICAL EQUIPMENT.
6. ALL LIGHT FIXTURES, SWITCHES AND WIRING DEVICES INSTALLED IN EXPERIMENTAL HALL AND HYDROGEN MANIFOLD ROOM SHALL COMPLY WITH NEC ARTICLE 501 FOR CLASS I, DIVISION I HAZARDOUS LOCATIONS.
7. INSTALL (2) LIGHTING CIRCUITS FROM EXPERIMENTAL HALL TO PANEL SWBD-MCA-1 IN 5" CIRCUIT.



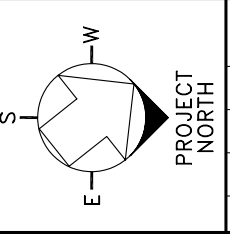
REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
REVISIONS		

**CMT**

CRAWFORD, MURPHY & TILLY, INC.  
CONSULTING ENGINEERS

600 NORTH COMMONS DRIVE  
SUITE 107  
AURORA, ILLINOIS  
60504  
(630) 820-1022  
(630) 820-0350 FAX

DESIGNED	A. BAJWA	DATE
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



SCALE:

1/4"=1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**  
**LIGHTING PLAN - II**

DRAWING NO. **4-1-35**

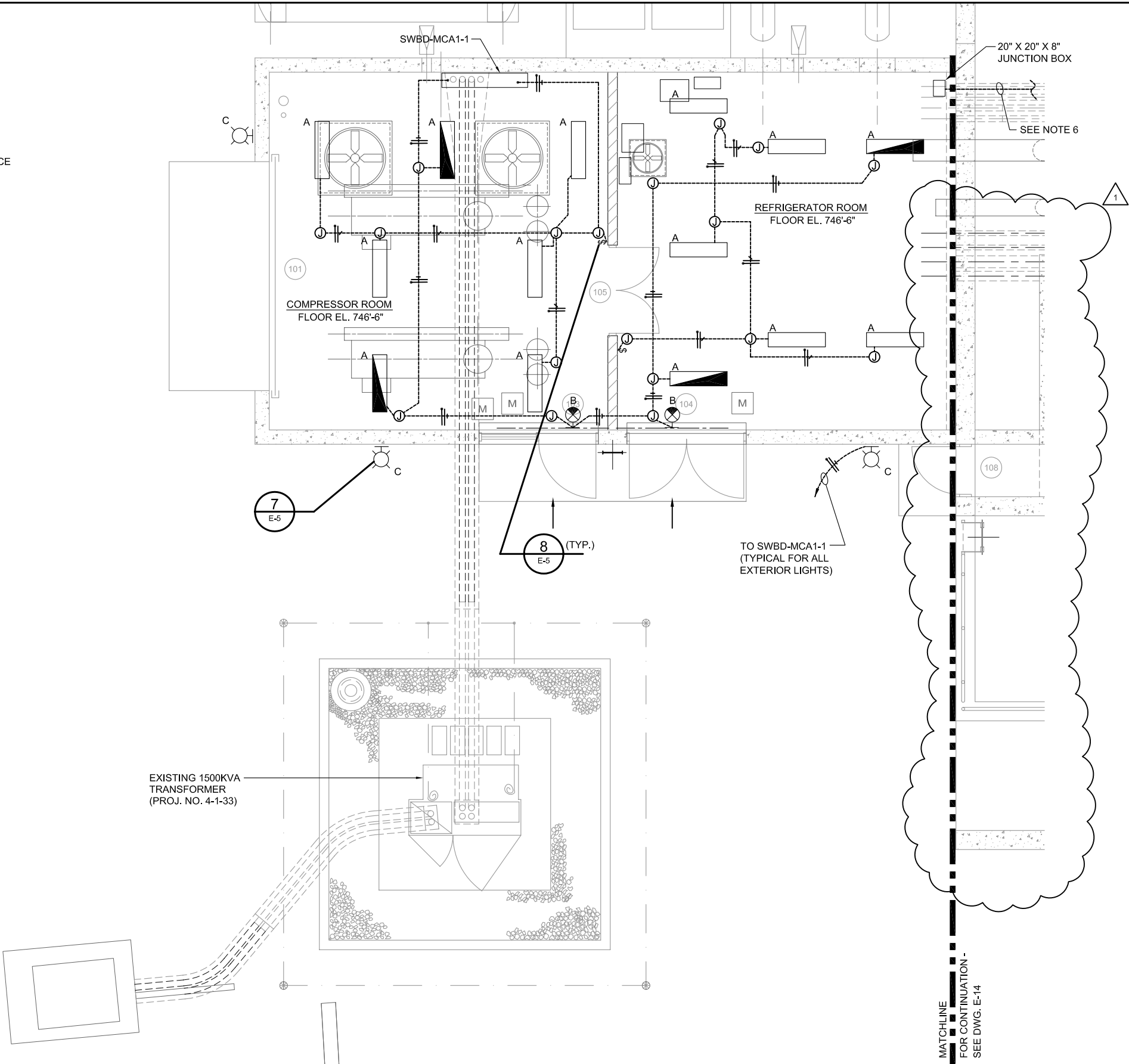
**E-13**

REV. 1

31 JAN 2003

NOTES:

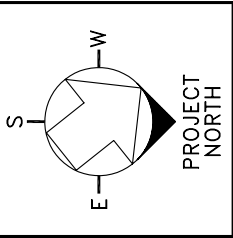
1. SEE DWG. E-1 & E-2 FOR SYMBOLS, AND GENERAL NOTES.
2. SEE DWG. E-3 FOR FIXTURE SCHEDULE.
3. ALL CONDUIT SHALL BE 3/4", UNLESS NOTED OTHERWISE.
4. ALL WIRE SHALL BE 1/C #12, UNLESS NOTED OTHERWISE.
5. SUBCONTRACTOR TO INSTALL EXIT SIGNS & OUTDOOR LIGHTING FIXTURE AS CLOSE TO DOOR AS POSSIBLE WITHOUT INTERFERENCE WITH MECHANICAL EQUIPMENT.
6. INSTALL (2) LIGHTING CIRCUITS FROM EXPERIMENTAL HALL TO PANEL SWBD-MCA-1 IN 5" CONDUITS.



1	01/31/03	REVISED ENCLOSURE WALLS
REV.	DATE	DESCRIPTIONS
		REVISIONS

**CMT**  
CRAWFORD, MURPHY & TILLY, INC.  
CONSULTING ENGINEERS  
600 NORTH COMMONS DRIVE  
SUITE 107  
AURORA, ILLINOIS  
60504  
(630) 820-1022  
(630) 820-0350 FAX

	NAME	DATE
DESIGNED	A. BAJWA	
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



SCALE:

1/4"=1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



**MuCOOL ENCLOSURE**  
**LIGHTING PLAN - I**

DRAWING NO. **4-1-35**

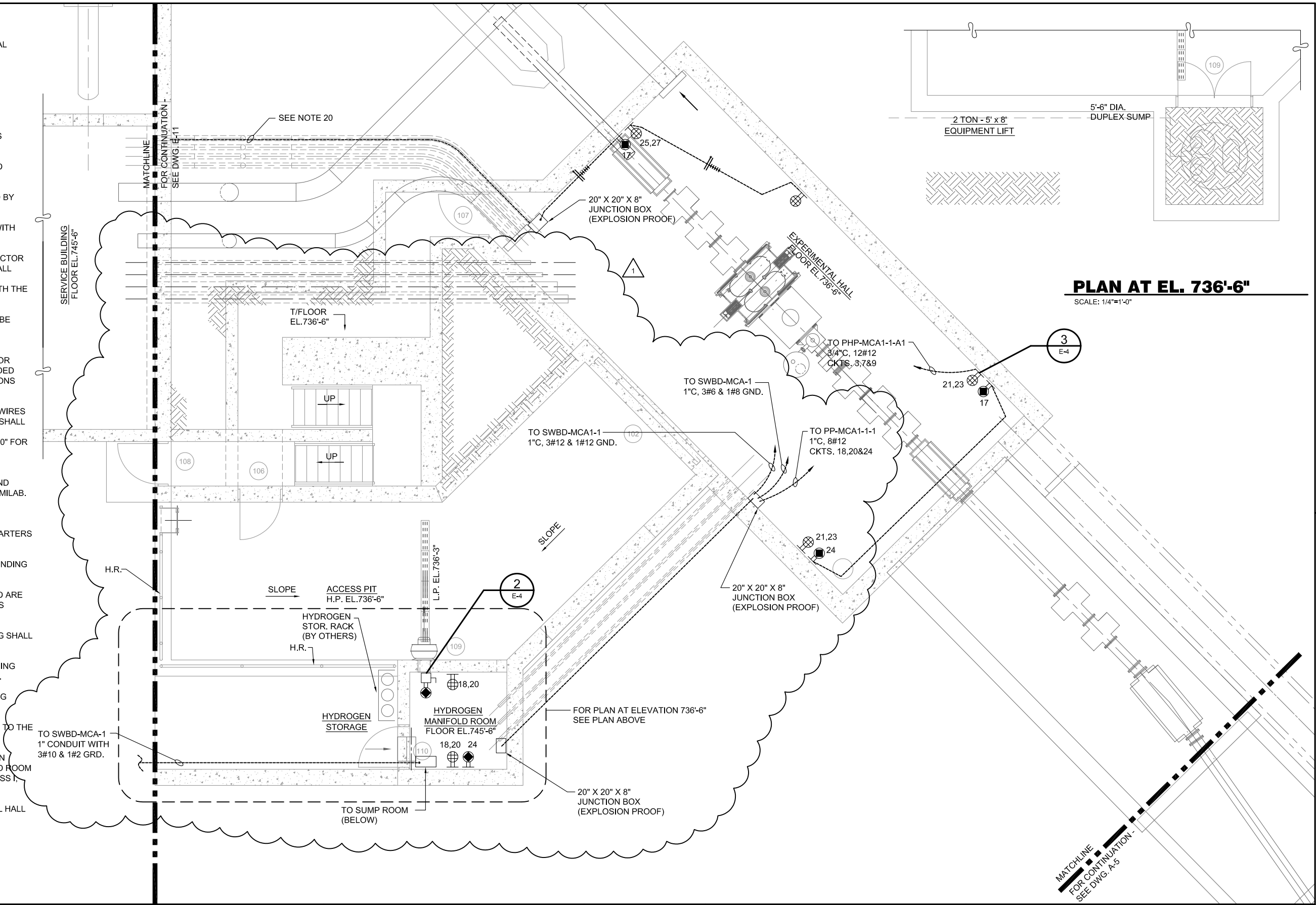
**E-12**

REV. 1

31 JAN 2003

NOTES:

- SEE DWG. E-1 & E-2 FOR SYMBOLS, AND GENERAL NOTES.
- ALL CONDUIT SHALL BE 3/4", UNLESS NOTED OTHERWISE.
- ALL WIRE SHALL BE 1/C #12, UNLESS NOTED OTHERWISE.
- ALL EMBEDDED CONDUIT SHALL BE 3/4", UNLESS OTHERWISE NOTED.
- SEE DWG. E-11 FOR ADDITIONAL UNDERGROUND CONDUITS.
- EQUIPMENT FURNISHED BY OTHERS, INSTALLED BY SUBCONTRACTOR.
- SUBCONTRACTOR TO VERIFY REQUIREMENTS WITH UNITS AS FURNISHED.
- FOR FERMILAB'S FUTURE USE, THE SUBCONTRACTOR SHALL ALSO PROVIDE (WHEN NOTED) AND INSTALL ADDITIONAL CABLE AND WIRE AS INDICATED ON DRAWINGS AND NOT DIRECTLY ASSOCIATED WITH THE ELECTRICAL DISTRIBUTION SYSTEM OR SUBCONTRACTOR INSTALLED EQUIPMENT. TERMINATION OF THE CABLES AND WIRES WILL BE PERFORMED LATER BY FERMILAB.
- ALL CABLES AND WIRES SHALL BE CONTINUOUS END-TO-END WITHOUT INTERMEDIATE SPLICES OR TAPS. ALL CABLES AND WIRES SHALL BE PROVIDED WITH A DESIGNATION AT EACH END. DESIGNATIONS SHALL BE UNIQUE TO EACH CABLE OR WIRE.
- WHEN INSTALLED IN CABLE TRAY, CABLES AND WIRES SHALL BE NEATLY INSTALLED IN THE TRAY AND SHALL BE SECURED TO THE TRAY AT INTERVALS NOT EXCEEDING 8' 0" FOR HORIZONTAL RUNS AND 4' 0" FOR VERTICAL RUNS.
- SUBCONTRACTOR SHALL BE RESPONSIBLE FOR TRANSPORTING FERMILAB SUPPLIED CABLES AND REELS FROM AN AREA TO BE SPECIFIED BY FERMILAB. THIS AREA WILL BE WITHIN THE FERMILAB SITE BOUNDARIES.
- SUBCONTRACTOR TO FURNISH AND INSTALL STARTERS FOR CHILLER PUMPS ON THE WALLS.
- ALL 5" CONDUITS SHALL HAVE A 48" MINIMUM BENDING RADIUS.
- ALL CONDUIT STUB-UPS ARE TO BE CAPPED AND ARE TO PROJECT 3" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED.
- ALL CONDUITS BELOW FLOOR SLAB OF BUILDING SHALL BE DIRECT BURIED RGS.
- SUBCONTRACTOR TO INSTALL INSULATED BUSHING NIPPLE TO CONDUITS PRIOR TO PULLING CABLE.
- ALL CABLE TRAY FITTINGS SHALL BE 24" BENDING RADIUS, UNLESS NOTED OTHERWISE.
- ALL CABLE TRAY SHALL BE SOLIDLY GROUNDED TO THE BUILDING GROUNDING SYSTEM.
- ALL ELECTRICAL MATERIAL AND INSTALLATION IN EXPERIMENTAL HALL AND HYDROGEN MANIFOLD ROOM SHALL COMPLY WITH NEC ARTICLE 501 FOR CLASS I, DIVISION I HAZARDOUS LOCATIONS.
- INSTALL POWER CIRCUITS FROM EXPERIMENTAL HALL TO PANEL SWBD-MCA-1 AND PP-MCA1-1-1 IN 5" CONDUITS.

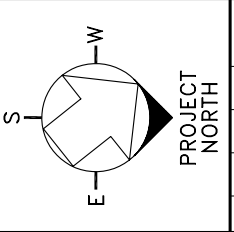


REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
0	01/06/03	CONFORMED DRAWING PER AMENDMENTS 1 & 2
REVISIONS		

**CMT**

CRAWFORD, MURPHY & TILLY, INC.  
CONSULTING ENGINEERS  
600 NORTH COMMONS DRIVE  
SUITE 107  
AURORA, ILLINOIS  
60504  
(630) 820-1022  
(630) 820-0350 FAX

	NAME	DATE
DESIGNED	A. BAJWA	
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



SCALE:  
1/4"=1'-0"

4048

SCALE

FEET

FERMI NATIONAL ACCELERATOR LABORATORY

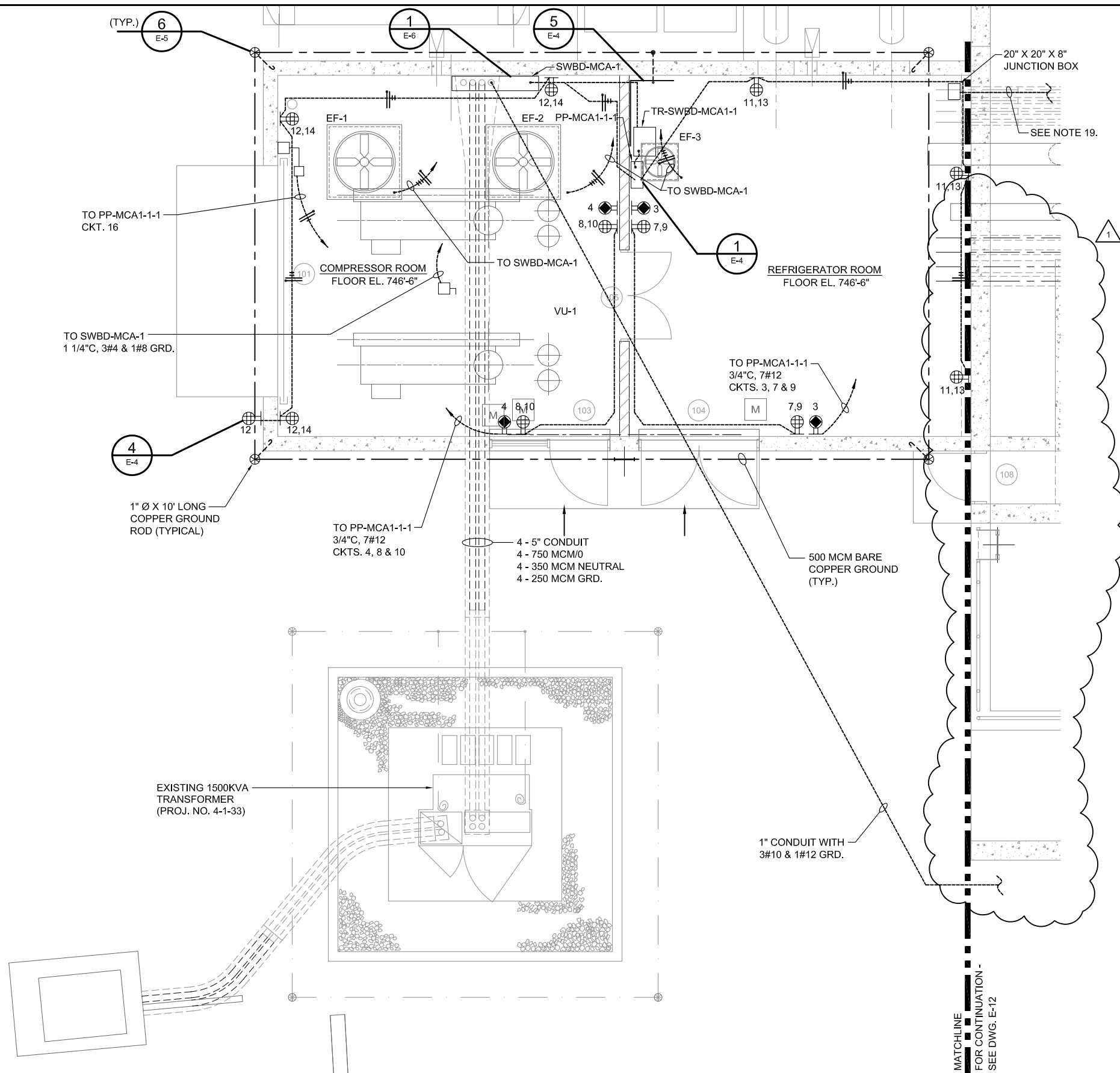
UNITED STATES DEPARTMENT OF ENERGY



MuCOOL ENCLOSURE  
POWER PLAN - II

DRAWING NO. 4-1-35 E-11 REV. 1

31 JAN 2003



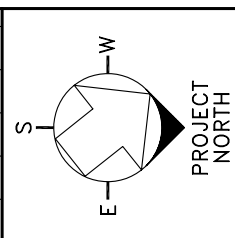
## NOTES:

- SEE DWG. E-1 & E-2 FOR SYMBOLS, AND GENERAL NOTES.
- ALL CONDUIT SHALL BE 3/4", UNLESS NOTED OTHERWISE.
- ALL WIRE SHALL BE 1/C #12, UNLESS NOTED OTHERWISE.
- ALL EMBEDDED CONDUIT SHALL BE 3/4", UNLESS OTHERWISE NOTED.
- SEE DWG. E-12 FOR ADDITIONAL UNDERGROUND CONDUITS.
- EQUIPMENT FURNISHED BY OTHERS, INSTALLED BY SUBCONTRACTOR.
- SUBCONTRACTOR TO VERIFY REQUIREMENTS WITH UNITS AS FURNISHED.
- FOR FERMILAB'S FUTURE USE, THE SUBCONTRACTOR SHALL ALSO PROVIDE (WHEN NOTED) AND INSTALL ADDITIONAL CABLE AND WIRE AS INDICATED ON DRAWINGS AND NOT DIRECTLY ASSOCIATED WITH THE ELECTRICAL DISTRIBUTION SYSTEM OR SUBCONTRACTOR INSTALLED EQUIPMENT. TERMINATION OF THE CABLES AND WIRES WILL BE PERFORMED LATER BY FERMILAB.
- ALL CABLES AND WIRES SHALL BE CONTINUOUS END-TO-END WITHOUT INTERMEDIATE SPLICES OR TAPS. ALL CABLES AND WIRES SHALL BE PROVIDED WITH A DESIGNATION AT EACH END. DESIGNATIONS SHALL BE UNIQUE TO EACH CABLE OR WIRE.
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- SUBCONTRACTOR SHALL BE RESPONSIBLE FOR TRANSPORTING FERMILAB SUPPLIED CABLES AND REELS FROM AN AREA TO BE SPECIFIED BY FERMILAB. THIS AREA WILL BE WITHIN THE FERMILAB SITE BOUNDARIES.
- SUBCONTRACTOR TO FURNISH AND INSTALL STARTERS FOR CHILLER PUMPS ON THE WALLS.
- ALL 5" CONDUITS SHALL HAVE A 48" MINIMUM BENDING RADIUS.
- ALL CONDUIT STUB-UPS ARE TO BE CAPPED AND ARE TO PROJECT 3" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED.
- ALL CONDUITS BELOW FLOOR SLAB OF BUILDING SHALL BE DIRECT BURIED RGS.
- SUBCONTRACTOR TO INSTALL INSULATED BUSHING NIPPLE TO CONDUITS PRIOR TO PULLING CABLE.
- ALL CABLE TRAY FITTINGS SHALL BE 24" BENDING RADIUS, UNLESS NOTED OTHERWISE.
- ALL CABLE TRAY SHALL BE SOLIDLY GROUND TO THE BUILDING GROUNDING SYSTEM.
- INSTALL POWER CIRCUITS FROM EXPERIMENTAL HALL TO PANELS SWBD-MCA-1 AND PP-MCA1-1-1 IN 5" CONDUIT.

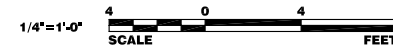
REV.	DATE	DESCRIPTIONS
1	01/31/03	REVISED ENCLOSURE WALLS
0	01/06/03	CONFORMED DRAWING PER AMENDMENTS 1 & 2
REVISIONS		



DESIGNED	A. BAJWA	DATE
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		



SCALE:



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



MuCOOL ENCLOSURE

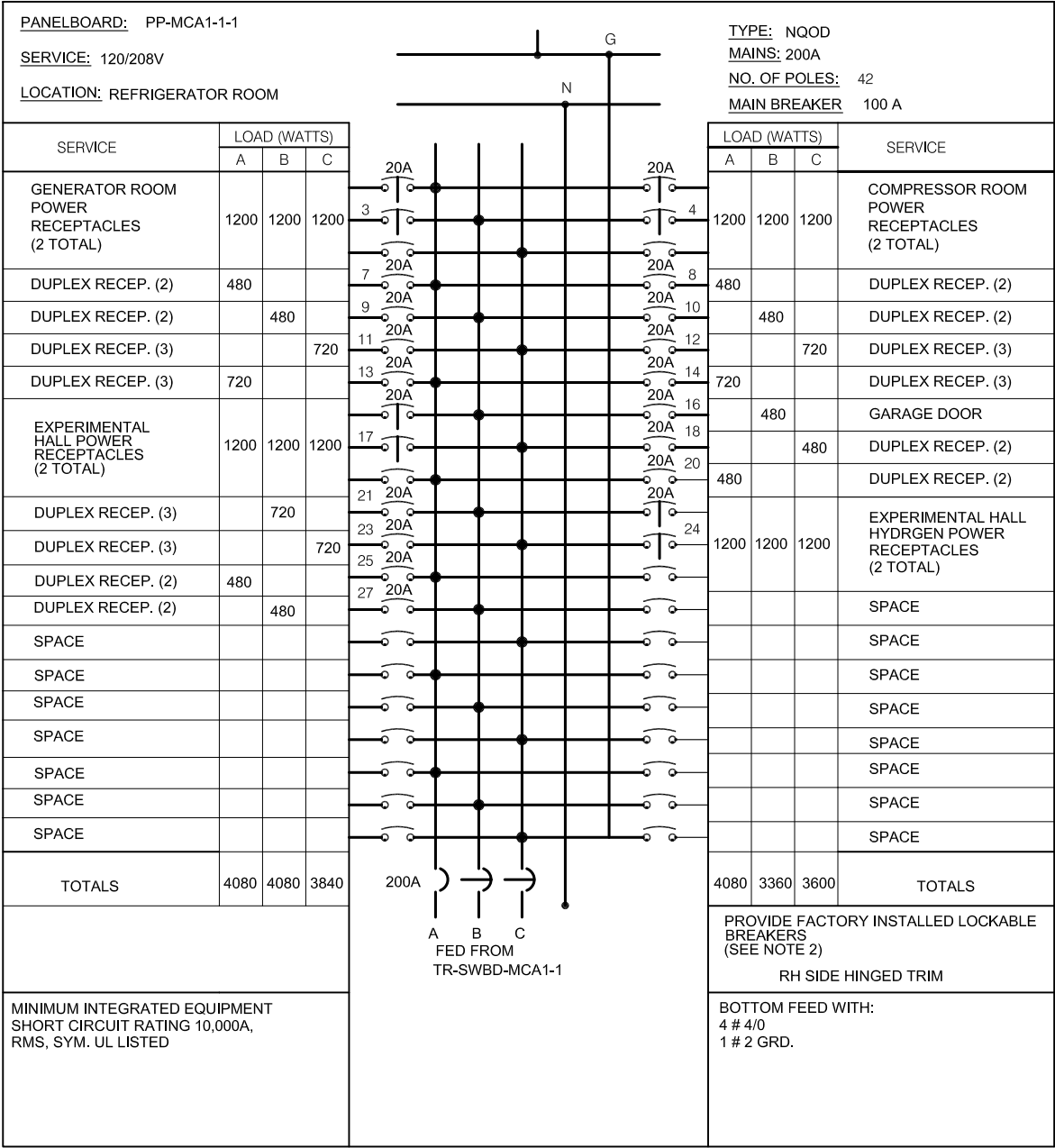
POWER PLAN - I

DRAWING NO. 4-1-35

E-10

REV. 1

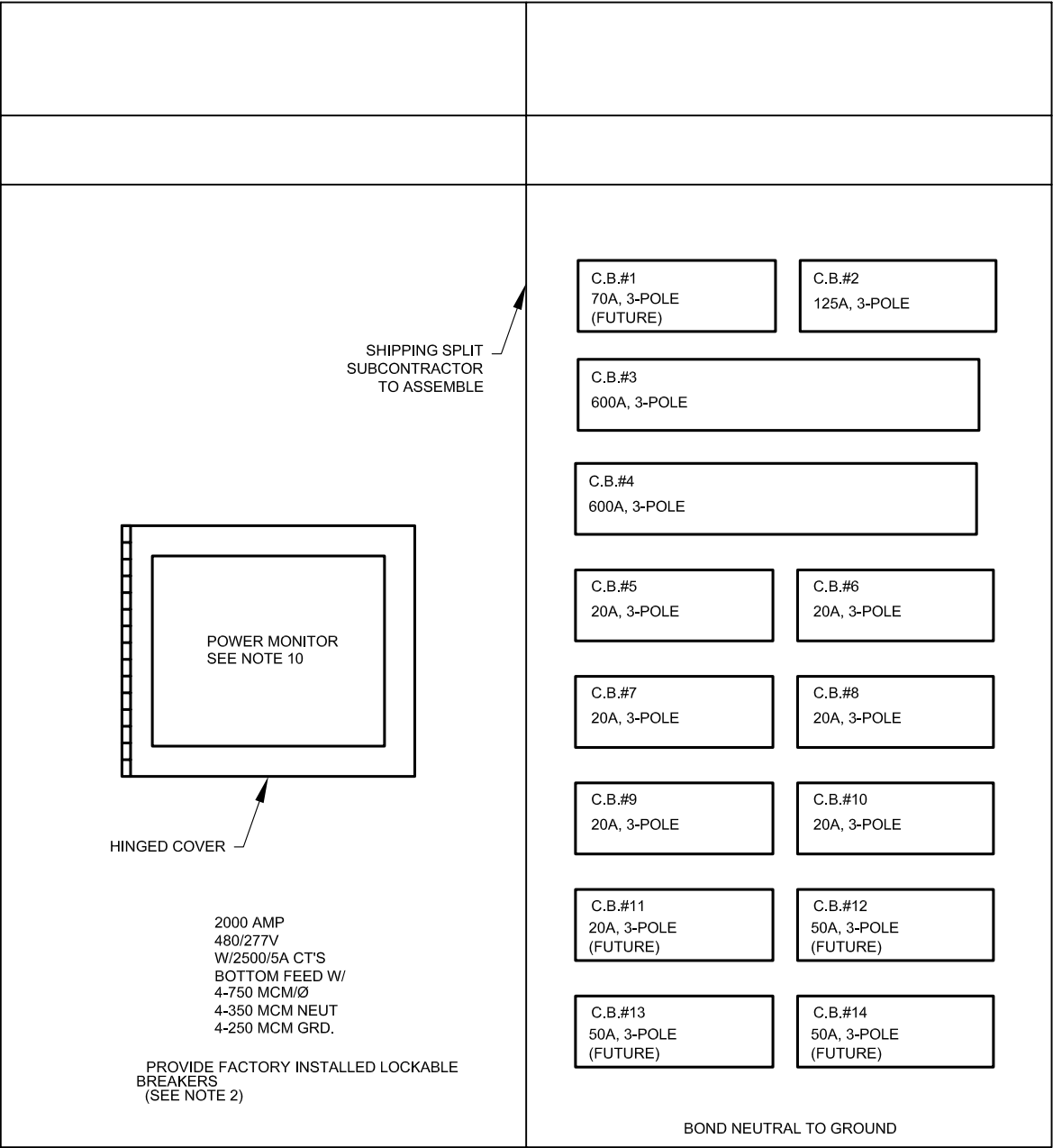
31 JAN 2003



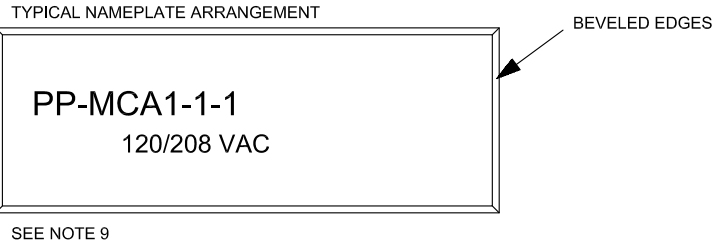
PANELBOARD PP-MCA1-1-1

PP-MCA1-1-1

120/208 VOLTS AC



SWITCHBOARD SWBD-MCA1-1



PANELBOARD NOTES

1. PANELBOARDS SHALL BE THE "I-LINE OR NQOD" TYPE AS FACTORY BUILT AND ASSEMBLED BY THE SQUARE-D COMPANY. PRE-ASSEMBLY SHOP DRAWINGS REQ'D.
2. SEE SPECIFICATION SECTION 16442 FOR GENERAL PANELBOARD AND CIRCUIT BREAKER LOCK REQUIREMENTS. USUALLY QO1PA OR QO1PL LOCKS ARE USED FOR NQOD PANELS AND I-LINES USE HPAFK LOCKS FOR FA'S OR KA'S, HPALM LOCKS ARE FOR LA'S OR MA'S.
3. PHASE ROTATION SHALL BE: INCOMING A-B-C LEFT-TO-RIGHT. LEFT SIDE BREAKERS SHALL BE A-B-C, TOP-TO-BOTTOM. I-LINE RIGHT SIDE BREAKERS SHALL BE C-B-A, TOP-TO-BOTTOM. EXCEPT FOR TOP-FED I-LINE PANELBOARDS C-B-A LEFT-TO-RIGHT.
4. PANELBOARDS SHALL USE PLATED COPPER BUS. NEUTRAL AND GROUNDING BLOCKS SHALL BE PLATED COPPER ONLY. ALUMINUM IS PROHIBITED.
5. ALL ELECTRICAL PANELBOARDS SHALL USE HINGED TRIM AND HAVE A HINGED DOOR OVER THE BREAKER COMPARTMENT FOR EASY ACCESS.
6. ALL CIRCUIT BREAKER SPACES SHALL BE NUMBERED. THE PANELBOARD DIRECTORY SHALL BE NEATLY TYPED TO CORRESPOND TO THE BREAKER NUMBERS AND FUNCTION.
7. 120/208 PANELBOARDS SHALL HAVE A 200 % RATED NEUTRAL.
8. ALL PANELBOARDS TRIMS SHALL BE ARRANGED FOR HINGED TRIM TO OPEN TO THE RIGHT-HAND SIDE UNLESS NOTED OTHERWISE.
9. PANELBOARD NAMEPLATES SHALL BE FURNISHED AND INSTALLED BY FERMILAB.
10. FOR POWER MONITOR DETAIL, SEE SHEET E-5.
11. LOAD SIDE CABLES FURNISHED AND INSTALLED BY FERMILAB.
12. PANELBOARD SCHEDULES SHOWN ON THIS SHEET ARE FOR BUILDING LOADS ONLY. CIRCUIT BREAKERS FOR TUNNEL, EXPERIMENTAL AND SPARE LOADS WILL BE ADDED LATER.
13. CIRCUIT BREAKER NUMBERS CAN BE FIELD COORDINATED FOR SWITCHBOARD.

0	01/06/03	CONFORMED DRAWING PER AMENDMENTS 1 & 2
REV.	DATE	DESCRIPTIONS
REVISIONS		

CMT

CRAWFORD, MURPHY & TILLY, INC.

CONSULTING ENGINEERS

600 NORTH COMMONS DRIVE

SUITE 107

AURORA, ILLINOIS 60504

(630) 820-1022

(630) 820-0350 FAX

	NAME	DATE
DESIGNED	A. BAJWA	
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

SCALE:

Fermilab Logo

Fermi National Accelerator Laboratory

UNITED STATES DEPARTMENT OF ENERGY

MuCOOL ENCLOSURE

PANELBOARD SCHEDULE 1

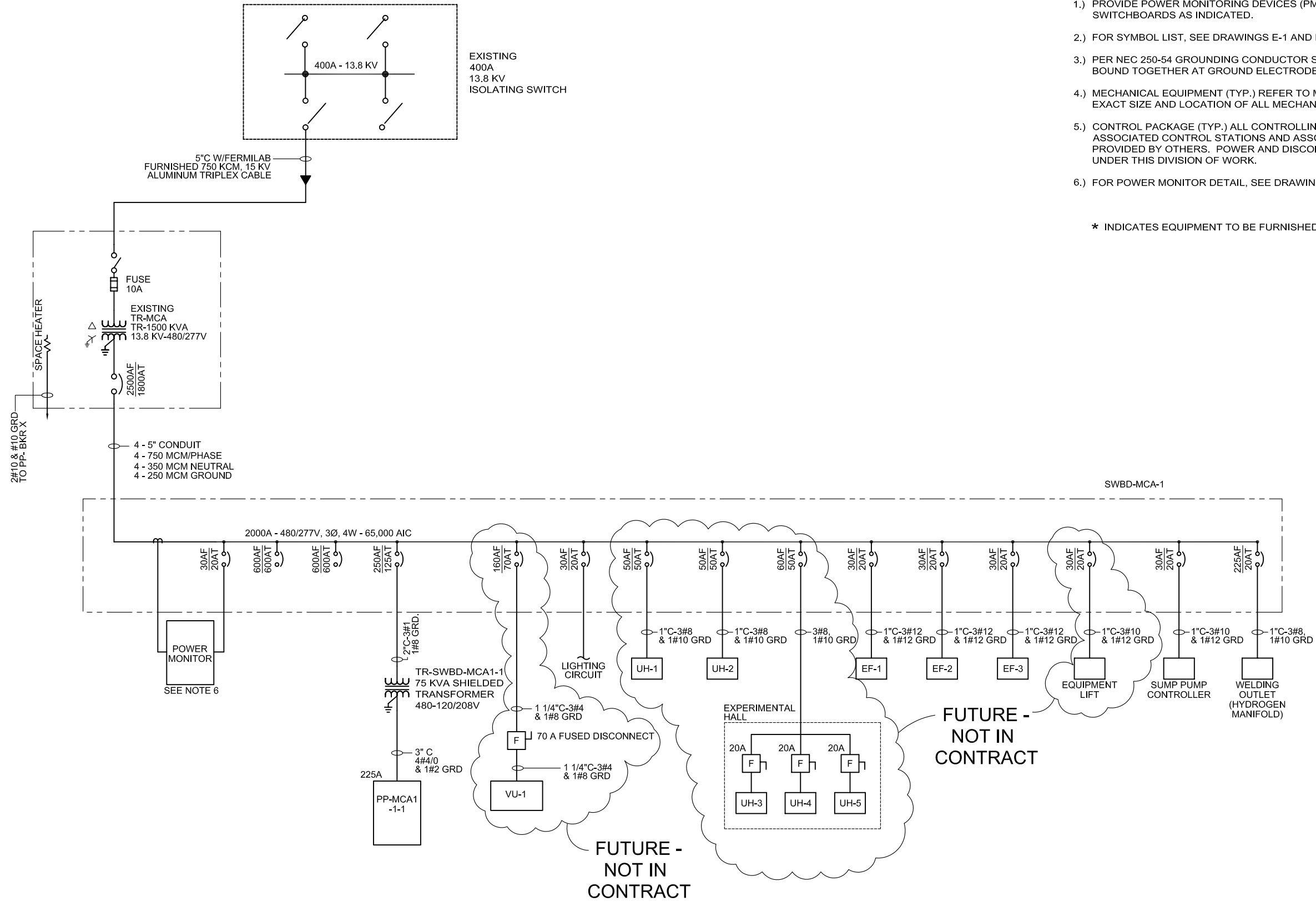
DRAWING NO.

4-1-35

REV.


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06 JAN 2003



- NOTES:
- 1.) PROVIDE POWER MONITORING DEVICES (PMD) WITH CT'S & PT'S AT NEW SWITCHBOARDS AS INDICATED.
  - 2.) FOR SYMBOL LIST, SEE DRAWINGS E-1 AND E-2.
  - 3.) PER NEC 250-54 GROUNDING CONDUCTOR SERVICE SHALL BE EFFECTIVELY BOUND TOGETHER AT GROUND ELECTRODE LOCATION.
  - 4.) MECHANICAL EQUIPMENT (TYP.) REFER TO MECHANICAL DRAWINGS FOR EXACT SIZE AND LOCATION OF ALL MECHANICAL EQUIPMENT.
  - 5.) CONTROL PACKAGE (TYP.) ALL CONTROLLING DEVICES, STARTERS, ASSOCIATED CONTROL STATIONS AND ASSOCIATED CONTROL WIRING PROVIDED BY OTHERS. POWER AND DISCONNECTION DEVICES SHALL BE UNDER THIS DIVISION OF WORK.
  - 6.) FOR POWER MONITOR DETAIL, SEE DRAWING E-6.
- \* INDICATES EQUIPMENT TO BE FURNISHED BY FERMILAB.

REV.	DATE	DESCRIPTIONS
0	01/06/03	CONFORMED DRAWING PER AMENDMENTS 1 & 2
REVISIONS		

**CMT**


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SUBMITTED		

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SCALE:
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**FERMI NATIONAL ACCELERATOR LABORATORY**  
UNITED STATES DEPARTMENT OF ENERGY

**MuCOOL ENCLOSURE**  
**SINGLE LINE DIAGRAM**

DRAWING NO. **4-1-35****E-7** REV. **0**

06 JAN 2003



1. \_\_\_\_\_ DENOTES FIELD WIRING
2. WIRE TYPE AND COLOR CODES SHALL BE:  
Va, Vb, Vc - 480/277VAC (BROWN, ORANGE, YELLOW), #12 AWG STRANDED COPPER, RATED 600VAC.  
NEUTRAL (WHITE) #12 AWG STRANDED COPPER, RATED 600VAC.  
CURRENT TRANSFORMER LEADS A+, B+, C+ (BLACK), #14 AWG STRANDED COPPER, RATED 600VAC.  
IN (WHITE) #14 AWG STRANDED COPPER, RATED 600VAC.  
GROUND WIRES AND EQUIPMENT BONDS (GREEN) #12 AWG STRANDED COPPER, RATED 600VAC. TO INSURE A SOLID CONNECTION, USE RING TONGUE COMPRESSION LUGS FOR ALL GROUND CONNECTIONS.
4. SECURE ALL CABLE BUNDLES WITH PLASTIC CABLE TIES (MINIMUM 8" INTERVALS BETWEEN TIES).
5. USE K.O. PUNCHES FOR ALL CONDUIT ENTRIES. NO HOLE SAW CUTS FOR K.O. HOLES.
6. VACUUM OUT ALL METAL CHIPS AND DEBRIS FROM INSIDE ELEC. ENCLOSURES.
7. USE RING-TONGUE LUGS OR SCREW PRESSURE CONNECTIONS, FORK TONGUE LUGS ARE PROHIBITED.
8. 2000AMP SWITCHBOARD SHALL BE SUPPLIED WITH INTEGRAL POWER MONITOR - SEE SPEC. 16441.

[illegible]

NAME		DATE
DESIGNED	<b>A. BAJWA</b>	
DRAWN		
CHECKED		
APPROVED		
SUBMITTED		

**SCALE:**

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## MuCOOL ENCLOSURE

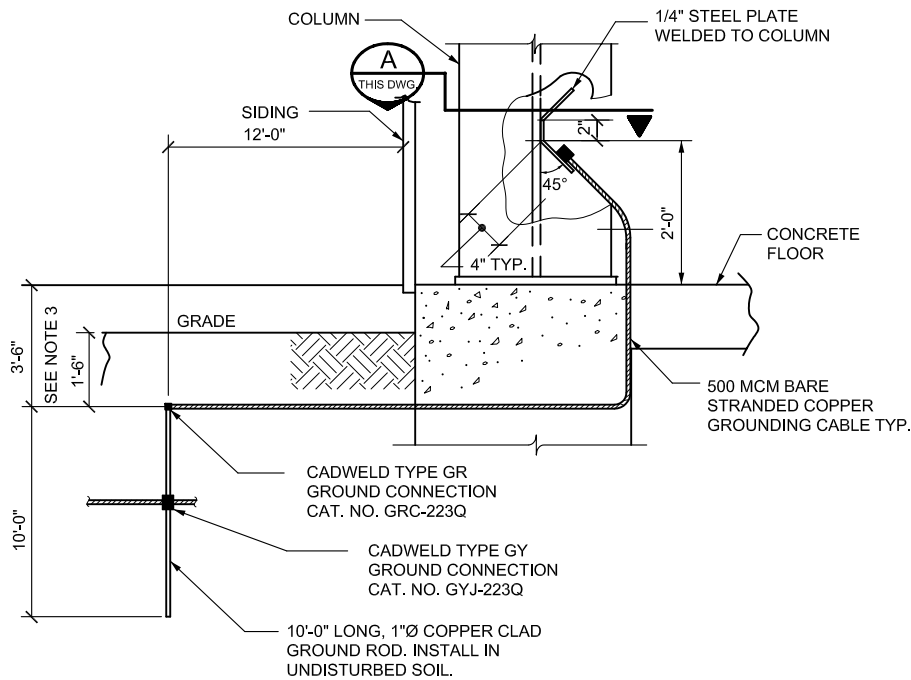
### POWER MONITOR DETAIL

DRAWING NO. **4-1-35**

E-6

REV.

09 SEP 2002

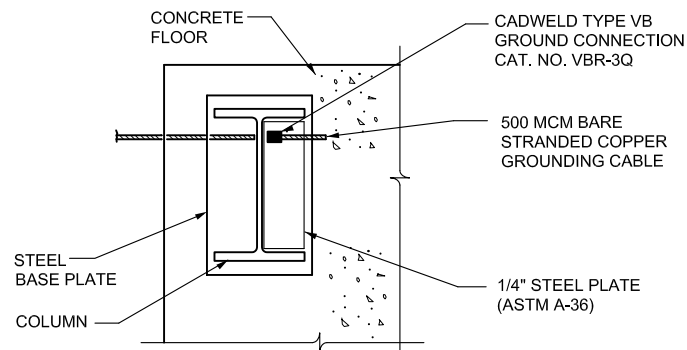


## GROUND ROD DETAIL

6  
E-10

N.T.S.

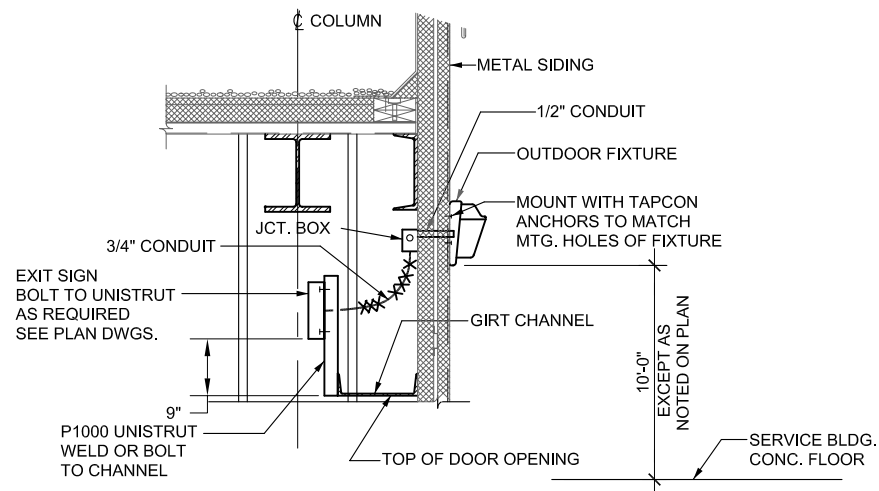
PLEASE NOTE: FLOOR PLAN SYMBOL -



## SECTION

A  
-

N.T.S.

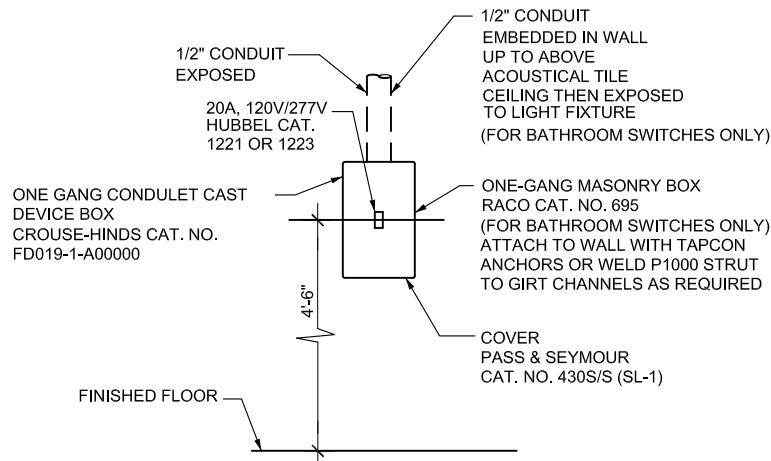
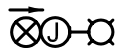


## MOUNTING DETAIL FOR OUTDOOR LIGHT & EXIT SIGN ON METAL PANEL WALLS

7  
E-12

N.T.S.

PLEASE NOTE: FLOOR PLAN SYMBOL -

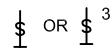


## SWITCH DETAIL

8  
E-12, E-13

N.T.S.

PLEASE NOTE: FLOOR PLAN SYMBOL -



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**MuCOOL ENCLOSURE**  
**MISC ELECTRICAL DETAILS 2 - SHEET 2**

DRAWING NO. **4-1-35**

**E-5**

REV.

09 SEP 2002

2007 JAN 09



FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP	BALLAST	MANUFACTURER	CATALOG NUMBER	REMARKS
A	48" FLUORESCENT FIXTURE, 32W, 277V, 2 LAMPS, RAPID START, 10% UP LIGHT, OPEN TYPE	SYLVANIA F032/741	277V, MOTOROLA ELECTRONIC BALLAST M2-RN-T8-ILL-277	LITHONIA	LA232277MOTRN	FOR SERVICE AND TECH. AREA, FUSED (NOTE 12)
B	EXIT SIGN WITH RED LETTERS, WHITE HOUSING, UNIVERSAL MOUNTING, WITH BATTERY, SINGLE OR DOUBLE FACE AS REQ'D.	L.E.D.	N/A	CHLORIDE	CX-L-A-(1 OR 2)-R-W	NON-RADIATION AREAS IN-LINE FUSE REQUIRED
C	28W FLOURESCENT, OUTDOOR FIXTURE WITH INTEGRAL PHOTO CELL CONTROL	FLUOR	277V, MOTOROLA ELECTRONIC BALLAST	LUMARK	PL-MP-PC-28-277 -LL-PE-FI-UB	FOR OUTDOOR FOR ENTRANCE DOORS
D	48" FLUORESCENT FIXTURE, 32W, 277V, 2 LAMPS RAPID START SURFACE MOUNT, WITH WIRE GUARD	SYLVANIA F032/41K	ELECTRONIC BALLAST M2-RN-T8-ILL-277	LITHONIA	C232277MOTRN W/WG9	FOR STAIRWAY FUSED (NOTE 12)
E	48" STRIP FIXTURE WITH CJ 4-FT LAMP, WIRE GUARD IN-LINE FUSE AND MAGNETIC ONLY BALLAST	SYLVANIA F0321741	277V, MOTOROLA ELECTRONIC BALLAST M2-RN-T8-ILL-277	DAY BRITE	CB232B-277-1/2EB	FUSED (NOTE 12)
F	48" EXPLOSION PROOF FIXTURE, 2 LAMPS RAPID START SURFACE MOUNT, WITH WIRE GUARD	FLUOR	277V, CLASS P	APPLETON	ARS240-277ESB	FUSED (NOTE 12) SEE NOTE 13
G	EXIT SIGN WITH RED LETTERS, PENDANT MOUNTED.	7W COMPACT FLUORESCENT	N/A	CHLORIDE	RP-277-HFP7-SEA-1XPN14	FOR CLASS I, DIVISION I LOCATIONS. SEE NOTE 13

GENERAL NOTES:

- DESCRIPTIONS, MANUFACTURER'S NAMES AND CATALOG NUMBERS OF LIGHTING FIXTURES ARE SPECIFIED TO ACHIEVE DESIRED LIGHTING LEVELS. REFER TO EXHIBIT "A" AND LIGHTING FIXTURE SPECIFICATION FOR MATERIALS SUBSTITUTIONS.
- LOCATION OF FIXTURES, PANELBOARDS, CABLE TRAY AND OTHER PIECES OF ELECTRICAL EQUIPMENT AS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED IN THE FIELD WITH THE LOCATION OF PIPES, VENTILATION DUCTS AND MECHANICAL EQUIPMENT TO AVOID INTERFERENCES. ANY CONFLICTS DERIVING FROM EQUIPMENT INSTALLATION SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE FERMILAB CONSTRUCTION COORDINATOR.
- ALL CONDUITS SHALL BE INTERMEDIATE METAL CONDUIT, EXEPT AS NOTED OTHERWISE. ALL CONDUITS SHALL CONTAIN AN INSULATED, GREEN COLORED GROUND WIRE CONDUCTOR.
- ALL WIRING SHALL BE COPPER, 600 VOLTS, TYPE THHN INSULATION. MINIMUM SIZE SHALL BE NO. 12 AWG. FOR POWER AND NO. 14 AWG. FOR CONTROL, UNLESS NOTED OTHERWISE.
- ALL SIMILAR TYPES OF EQUIPMENT SHALL BE OF THE SAME MANUFACTURER: I.E. ALL SAFETY SWITCHES, ALL PANELBOARDS, ETC.
- FINAL CONNECTION TO TRANSFORMERS, MOTORS OR OTHER VIBRATION GENERATING DEVICES SHALL BE MADE WITH USE OF STRANDED CONDUCTORS IN LIQUID TIGHT FLEXIBLE METAL CONDUIT.
- ALL EQUIPMENT SHALL BE GROUNDED USING AN INSULATED GREEN COLORED OR BARE COPPER GROUND WIRE.
- ALL PULL BOXES AND JUNCTION BOXES SHALL BE SIZED PER THE LATEST EDITION OF THE NEC. SUBCONTRACTOR SHALL SIZE, FURNISH AND INSTALL ALL PULL BOXES OR JUNCTION BOXES AS REQUIRED BY THE NEC.
- ALL MATERIAL AND ELECTRICAL EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES, INC. ALL INSTALLATIONS SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE LATEST EDITION OF THE NEC AND OSHA.
- MAXIMUM NUMBER OF WIRES (#12 AWG CU TYPE THHN) IN CONDUITS WHERE SIZE IS NOT SHOWN:
 

3/4"C 14 #12  
 1"C 23 #12
- ALL ELECTRICAL INSTALLATIONS SHALL BE SUBJECT TO THE REVIEW AND APPROVAL OF THE FERMILAB CONSTRUCTION COORDINATOR. ANY ELECTRICAL INSTALLATION NOT MEETING THE APPROVAL OF THE FERMILAB CONSTRUCTION COORDINATOR SHALL BE REMOVED AND REINSTALLED TO THE SATISFACTION OF FERMILAB BY THE SUBCONTRACTOR, AT NO COST TO FERMILAB.
- ALL BALLASTED FIXTURES SHALL HAVE A SINGLE IN-LINE FUSE (BUSSMAN HEB-AA STYLE)
- ALL LIGHT FIXTURES, LIGHT SWITCHES, JUNCTION BOX AND WIRING IN EXPERIMENTAL HALL AND HYDROGEN MANIFORD ROOM SHALL COMPLY WITH NEC ARTICLE 501 FOR CLASS I, DIVISION I HAZARDOUS LOCATIONS.

			 <div> CMT  <small>CRAWFORD, MURPHY &amp; TILLY, INC. CONSULTING ENGINEERS</small>  <small>600 NORTH COMMONS DRIVE SUITE 107 AURORA, ILLINOIS 60504 (630) 820-1022 (630) 820-0350 FAX</small> </div>	NAME		DATE			SCALE:	FERMI NATIONAL ACCELERATOR LABORATORY			
				DESIGNED	A. BAJWA					UNITED STATES DEPARTMENT OF ENERGY			
				DRAWN						 <div> MuCOOL ENCLOSURE  LIGHT FIXTURE SCHEDULE </div>			
				CHECKED									
				APPROVED									
				SUBMITTED									
REV.	DATE	DESCRIPTIONS							DRAWING NO.	4-1-35	E-3	REV.	09 SEP 2002
		REVISIONS											





